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Hodnocení výkonnosti IPO na burze cenných papírů v Šanghaji
The Performance Evaluation of IPOs in the Shanghai Stock Exchange

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3. Description of Regression Analysis
4. Performance Evaluation of Selected IPOs
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Annexes

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The declaration

"Herewith I declare that I elaborated the entire thesis, including all annexes independently."

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Contents

1 Introduction

The success of the IPO plays a very important role in the company's own development. Through the IPO, companies can not only raise the funds needed for long-term development, solve the most difficult financial problems, but also improve the company's popularity and employee's sense of responsibility, which is conducive to the company's routine management and system construction. At present, the research on IPO in European and American countries mainly focuses on IPO underpricing, weak IPO performance, and hot selling of new shares. IPO performance refers to the market performance within 3-5 years after the listing of new stocks. At present, the research is mainly based on performance measurement methods. The explanation of the poor performance of new stocks by European and American scholars is mainly from the perspective of behavioral finance, combining the performance of new stocks with the excess returns on the first day of new stocks for research. The usual methods for studying the performance of new stocks are the calendar time method and the event time method. The market risk adjustment method and matching company risk adjustment method are mainly used when selecting a benchmark combination. The cumulative abnormal return rate (CAR) and holding period are mainly used when calculating the return of new shares. The buy-and-hold abnormal return rate (BHAR) and the calculation of the weighting of the new stock portfolio mainly use the market value weighting method and the equal weighting method. Although each method has different degrees of defects, they can explain the performance of new shares from a certain angle.

The main objective of the thesis is to assess the impact of selected variables on the stock performance of newly issued stocks on Shanghai Stock Exchange after three years of IPO. The analysis is based on 100 IPOs from the period 2009-2016. For the purposes of the model estimation, we consider eight variables with a potential impact on stock performance, both macroeconomic and corporate factors. The variables include return on equity, net profit, earning per share, capital, interest rate, GDP,

inflation rate and stock market index.

This thesis is divided into five chapters. The first chapter is an introduction to the motivation and significance of writing this thesis, and briefly describes the general content of each chapter. The second chapter is the introduction of related concepts. In this chapter, the development of the Chinese stock market, the development of the Shanghai Stock Exchange, the IPO review system, and the IPO pricing system are introduced. The third chapter is an introduction to the methods used in this thesis. It introduces some empirical methods to be used in this thesis, and focus on multiple linear regression analysis, through the establishment and evaluation of multiple linear regression model to study IPO performance. The fourth chapter is the evaluation research of IPO performance of Shanghai Stock Exchange, using correlation test, significance test and other methods for analysis, and establishing a regression model. The fifth chapter is the overall conclusion.

2 Overview of Stock Market in China

This chapter introduces the development of the Chinese stock market, the development of the Shanghai Stock Exchange, and some theories on IPO performance.

2.1 Development of China's Stock Market

The development of China's stock market has experienced a historical process from germination, emergence, development to standardization. So far, this process can be summarized in three stages:

The first stage is initial stage. The issuance of stocks and the development of the stock market are prerequisites for the development of joint-stock enterprises. In other words, the shareholding system is the organizational basis for the development of the securities industry. The pilot of China's shareholding system reform started in 1984. In November of this year, Shanghai Feilo Audio Co., Ltd. issued its first public offering to the whole society since liberation. Since then, various pilot companies across the country have started to issue a small number of shares, and by the end of 1988, a total of 3.5 billion shares had been issued nationwide. During this period, the Chinese stock market is still in its infancy, and its characteristics are as follows: 1) The investors are not only dominated by retail investors and lack the participation of institutional investors, but they are mostly numb. People's investment consciousness is still quite weak, and the response is cold or even indifferent. For example, when the Shenzhen stock market was established in 1987, residents lacked knowledge of the stock market. [1]The stock of the first listed company, Shenzhen Development Bank, was scarcely interested, and the trading market was deserted. The 8 million yuan of stocks issued at that time cost a lot of money.[2] By the end of 1988, the transaction amount was only 4 million yuan. 2) The size of the stock market object is small and extremely irregular. At that time, the stocks issued by our country were not only limited in amount but

[1]Source：Krishnan (2011）

[2]Source：Zhang (2011)

extremely irregular. Many stocks have not been approved by any department, nor are they real stocks, and they are the names of stocks and bonds. "Capital preservation and value preservation, return on time" printed on stocks, confusing the difference between stocks and bonds. According to statistics, 90% of the stocks issued during this period are "stocks" of the nature of bonds. 3) The stock market donors are extremely imperfect. Mainly manifested in the lack of supporting and orderly securities trading system and management system, lack of management experience, lack of macro-control, unsound regulations, and backward trading methods and means.

The second stage is development stage. During this period, according to the "Notice on Strengthening the Management of Stocks and Bonds" issued by the State Council, all localities conscientiously summed up their experience, strengthened management, and cleaned up and rectified the bond-like stocks at the initial stage, and transferred the internal issued stocks were changed to internal bonds. Coupled with the guidance of the propaganda media, especially driven by the benefits of year-end dividends and stock distribution, the shareholders realized the benefits of stock investment through practice, which greatly mobilized the enthusiasm of the shareholders. Since the beginning of 1989, the Chinese stock market began to pick up. In 1990, the Shenzhen and Shanghai stock markets had begun to take shape, and the number of listed companies increased to 5 and 7 respectively.[3] At the end of 1990, China issued a total of 4.59 billion yuan of stocks. But overall, the development of the Chinese stock market during this period is not yet mature. The quality of stockholders is not high. This is reflected in the poor perceptions of investors such as investment, cost, profitability, and risk, especially their low risk tolerance and blindness. The Shenzhen stock market directed a drama, the "8.10 incident". According to reports, as of August 7, 1990, as many as 1.3 million to 1.5 million foreign investors (more than double the population in Shenzhen) have poured into Shenzhen to buy new shares. Due to the serious imbalance between supply and demand, from the evening of the 10th, some stockholders who had not been able to obtain anything after the queue for several

[3]Source：Bonardo (2011)

days and nights could not suppress the disappointment of the stock purchase and the rude attitude of the few people who went through the backdoor and maintain the order in the sale Resented, he began to take slogans to the streets. Traffic was blocked after night, and several cars were burned in front of the city government. Eventually, water guns and tear gas quelled the storm on the streets. Abnormal stock price fluctuations. During this period, stocks not only issued irregularly, but took the form of cash receipts, and the imbalance between supply and demand led to abnormal stock price fluctuations. For example, the Shenzhen stock market began to rise in February 1989-1990, and the price-earnings ratio increased from 0.2% -0.3% to 1-2 times: from March to June 1990, it was in a frenzy stage, and the price-earnings ratio reached about 20 times; June to 11 Month, in the stage of coexistence of rectification and fever, the price-earnings ratio reached 73 times, and the black market reached more than 100 times. [4]Since December, it has entered a plunge. 3. The stock market donors are still very imperfect. The supporting macro-control, especially the legal system has not yet been introduced, and the transactions are not standardized, especially the "insider trading" and "black market trading" cannot be stopped. The trading methods are mainly manual operations, and the implementation of price-limit trading is an open trading market. Not yet established.[5]

The third stage is standardization stage. Since the 1990s, China's stock market has not only developed rapidly, its scale has continued to expand, and it has gradually become standardized. Its characteristics are as follows: 1) Investors are diversified, and stockholders' awareness of the stock market has increased. In addition to retail investors, institutional investors have increased, and the mutual fund market has developed initially. According to statistics, by the end of 1993, China had established 56 funds of various types, absorbing a total of 475.8 billion yuan in funds, distributed in 21 provinces and cities, and 33 funds have been traded in securities centers around the country. With the upsurge of financial markets (especially stocks), securities are gradually becoming popular in China, and residents' financial investment

[4]Source：Harjeet (2003)

[5]Source：Galbraith (2001)

consciousness is continuously popularized, deepened and strengthened. 2) The scale of the stock market has gradually expanded and transactions have become increasingly active. In just a few years, China's stock market has developed rapidly, and the stock market has expanded rapidly. Statistics show that in 1991, there were only 14 listed stocks in China. By the end of 1993, there were 215 listed stocks in Shenzhen and Shanghai. At the end of 1994, all stocks of listed companies in Shenzhen and Shanghai stock markets rose to 346. Stocks (170 types of A shares and 34 types of B shares), and 142 types of stocks of Shenzhen Stock Exchange (118 types of A shares + 24 types of B shares).[6] In 1993, nearly 5 billion new shares were issued nationwide. The actual issuance and listing is about 3.5 billion yuan. New shares will be issued in 5.5 billion yuan in 1995. There were 6 H shares listed on the Hong Kong Stock Exchange in 1993 and 22 in 1994. In addition, there are more Thousands of companies have issued internal stocks. The stock itself has also changed from a cash receipt to a standardized stock, from the past "one household and one vote" to "one lot and one vote".

Of course, due to lack of experience and other reasons, there are still many problems in China's stock market. Overall, China's stock market is still immature.

2.2 Characteristics of China's Stock Market

The biggest feature of the Chinese stock market is that state-owned shares and legal person shares are promised not to be circulated when they are listed. Therefore, only the tradable shares of each stock are traded in the market according to the stock price, but the index is weighted based on the total share capital, thus forming a many specialty.

After 2001, the China Securities Regulatory Commission gradually proposed to solve the problem of non-negotiable state-owned shares, and to revitalize state-owned assets, and had successively issued some plans. However, because in the initial listing and issuance process, circulating shareholders bought circulating shares at a very high price-earnings ratio, and these plans issued have more or less harmed the interests of

[6]Source：Holcomb (2010)

circulating shareholders, so the market took the bear and reduced the "state-owned shares" Market reforms. Later, due to market pressure, the China Securities Regulatory Commission announced the suspension of the "reduction of state-owned shares" reform.

However, in 2005, the China Securities Regulatory Commission once again proposed the "shareholding split reform", the essence of which is still the reduction of state-owned shares. The difference is that this reform aims to eliminate the shareholding split. Even the circulation of legal person shares is included. This caused great disagreement in the market.

The market's disagreement on the split share structure reform is still huge. Therefore, in 2011, the Chinese stock market entered the big bear market, which can be regarded as the world's most bearish, falling all the way, falling to the original point of 2228.[7]

2.3 Relevant Explanations of Shanghai Stock Exchange

This section mainly introduces the Shanghai Stock Exchange. In addition, it also introduces the Shanghai Stock Exchange's approval system and pricing methods.

2.3.1 Introduction to Shanghai Stock Exchange

The Shanghai Stock Exchange was established on November 26, 1990, and opened on December 19 of the same year, subject to the supervision and management of the China Securities Regulatory Commission. The Shanghai Stock Exchange is committed to creating a transparent, open, safe and efficient market environment. Its main functions include: providing venues, facilities and services for securities trading; formulating and modifying business rules of the stock exchange; reviewing and arranging securities listing transactions and decisions Suspension, resumption, termination and re-listing of securities; provision of non-public offering of securities transfer services; organization and supervision of securities transactions; supervision of

[7]Source：Schuster (1996)

members; supervision of securities listed trading companies and related information disclosure obligors; listing of securities service agencies for securities Supervise the provision of services such as trading and trading; manage and publish market information; carry out investor education and protection; laws, administrative regulations and other functions permitted, authorized or entrusted by the China Securities Regulatory Commission.

The Shanghai Stock Exchange has offices (Party Committee Office, Council Office), Human Resources Department (Party Committee Organization Department), Party Construction Office (Party Committee Propaganda Department), Discipline Inspection and Supervision Office, Transaction Management Department, Issuing and Listing Service Center, Science and Technology Board Listing Audit Center, Listed Company Supervision Department I, Listed Company Supervision Department II, Science and Technology Board Company Supervision Department, Supervision Implementation Department, Circuit Review Cooperation Department, Member Department, Bond Business Center, International Development Department, Product Innovation Center, Market Supervision Department I , Market Supervision Department 2, Law Department, Investor Services Department, Corporate Training Department, Technology Management Department, Information Management Department, Beijing Center, Finance Department, Internal Audit Department (Supervisory Board Office), Capital Market Research Institute, Museum Security Department, Hong Kong 30 internal departments such as the office and the London office, 2 temporary working groups including the infrastructure working group (co-signed with Zhuyuan Company), the free trade zone trading platform preparation working group, and the information of SSE Technology Co., Ltd. and SSE Network Co., Ltd., Shanghai Securities Financial Services Co., Ltd., Shanghai Zhuyuan Engineering Management Ltd., the Shanghai Information Technology Co., Ltd., China Investment Information Co., the Shanghai Composite Data Services Co., Ltd. and other seven subsidiary companies, through their rational division of labor and coordinated operation, effectively assumed the role of organizer of the securities market, regulators. In addition, the Shanghai Stock

Exchange also participated in 17 companies (institutions).

After 29 years of rapid growth, the Shanghai Stock Exchange has developed into a stock exchange with four major types of securities transactions including stocks, bonds, funds and derivatives, and a relatively complete market structure; it has transactions that can support the efficient and stable operation of the Shanghai stock market System and basic communication facilities; have a self-regulatory system that can ensure the standard and orderly operation of the Shanghai stock market and have significant effectiveness. Relying on these advantages, the scale of the Shanghai stock market and the investor base are also growing rapidly.

As of the end of 2018, the number of listed companies on the Shanghai Stock Exchange reached 1,450, with a total market value of 27.0 trillion yuan; the cumulative stock turnover in 2018 was 40.3 trillion yuan, with an average daily turnover of 165.9 billion yuan, and a total stock market financing of 611.4 billion yuan; the bond market The number of listed companies is 12,089, the custody volume is 8.4 trillion yuan, and the cumulative turnover is 216.9 trillion yuan; the fund market is only 233, with a cumulative turnover of 7.2 trillion yuan; and the derivative market has a cumulative turnover of 179.8 billion yuan for the whole year. The number of investors opening accounts in Shanghai has reached 296.1 million.

2.3.2 Shanghai Stock Exchange IPO Review System

The Shanghai Stock Exchange was established during the transition period from the planned economy to the market economy. The IPO audit system mainly includes the following three types:

(1) Approval system

From 1993 to 2000, it was the approval stage. Before 2000, China's securities market was at the early stage of development. [8]The stock issuance adopted an approval system that combines the approval of the local government or the competent authority of the central enterprise with the review of the China Securities Regulatory

[8]Source：Semenenko (2016)

Commission and the listing review of the stock exchange listing committee. The main feature of the approval system is: the implementation of quota management. The annual national stock issuance quota is determined by the China Securities Regulatory Commission and the State Planning Commission according to the economic situation of the year, and this quota is decentralized to provinces, autonomous regions, and municipalities. Therefore, if an enterprise wants to issue stocks, it must obtain the corresponding issuance quota if it meets specific substantive requirements. The quota-based management of stock issuance launched in 1993, although there are certain restrictions on stock issuance, during this period, the company's IPO far exceeded the pilot period in terms of the number of stock issuances and the scale of financing. Implement a secondary approval system. The first review authority is the relevant State Council competent authority, the second review authority is the CSRC, and both review quotas must be within the plan.

(2) Approval system

With the continuous development of China's securities market, the approval system is no longer suitable for China's capital market. Therefore, the stock issuance system began to go beyond the approval system, and was formally implemented in March 2001. Under the approval system, the supervisory layer supervises the stock issuance market through the channel system. The so-called "channel system" refers to a certain number of channels (1-8) granted to a brokerage underwriting qualification, and a brokerage can only recommend a certain number at a time Of companies conduct stock issuance, and only after one company is issued successfully can the recommendation of the next one be issued. The management can control the number of listed companies through the control of brokers.[9]

Under the approval system, the supervisory authority has certain key decisions on whether a company can go public. The approval system also has certain shortcomings:

① Supervisory departments sometimes make mistakes in value judgment, which

[9]Source：Gu (2003)

results in companies that have the conditions for listing not being able to go public in time, hindering the development of the company.

② Investors will also rely on psychology because of the supervision of the regulatory part, instead of actively analyzing the company, resulting in blind investment. Although the approval system has certain flaws, it still has a lot of advancedness compared to the approval system. In order to better play the role of China's capital market, further exploration is needed.

With the implementation of the "Interim Measures for the Stock Issuance Review Committee" at the end of 2004, the confidentiality mechanism for the issuance review committee identity was cancelled, and the accountability mechanism and supervision mechanism of the issuance committee began to be implemented, opening the door to the market-oriented reform of the issuance system. In 2006, a number of measures to regulate the development of the capital market were successively introduced, gradually establishing mechanisms such as additional issuance, share allotment, and strict sponsorship responsibilities, and the cancellation of one-year mandatory counseling regulations, innovation in financing methods, and simultaneous issuance of domestic and foreign markets The implementation of a series of new stock issuance systems such as the launch of listings and the pilot over-allotment option greatly strengthened the market's restraint mechanism and improved the efficiency of securities issuance.

(3) Registration system

The registration system means that all applicants will issue all information and materials related to the issuance into standardized legal documents and submit them to the securities regulatory authority for review. [10]The competent authority is only responsible for the company’s information disclosure obligations. Under registration, the auditing agency only reviews the legal documents submitted by the applicant, without making substantial judgments, which is the main difference between it and the approval system.

[10]Source：Hasan (2013)

The registration system can simplify the IPO administrative approval process, focus on clarifying responsibilities and supervision during and after the event, and improve the efficiency of issuance. In the long run, the implementation of the registration system will greatly improve the degree of marketization and more effectively leverage the financing and pricing of the capital market. Features. However, the implementation of the registration system requires a complete supporting system and a sound market mechanism. Therefore, the full implementation of the registration system in China requires a step-by-step process, which cannot be achieved in one step; on the other hand, the registration system is also the general trend of China ’s capital market development, especially It is the introduction of "Several Opinions on Further Regulating the Operation of Issuance Examination Power" that marks a solid step for the A-share to the registration system.

2.3.3 Shanghai Stock Exchange IPO Pricing Model

IPO is the primary link for stocks to participate in market transactions and is closely related to the vital interests of investors, issuers and underwriters. IPO pricing is the process by which the lead underwriter of securities determines the price of the securities to be issued, and is the price applicable to investors at the time of subscription. The company's book market value, operating performance, development prospects, industry characteristics and market fluctuations are all related factors that affect IPO pricing, and with different pricing methods, its impact on IPO prices is also different. The pricing mechanism of China's listed companies' IPO is mainly divided into the following four aspects:

(1) Administrative pricing

Before July 1999, China's IPO pricing method was administrative pricing, that is, the IPO price was calculated and determined by the regulatory department according to a fixed formula. [11]This pricing mechanism is applicable to the initial stage of the establishment of China's capital market. With the continuous

[11]Source：Carter (2000)

improvement of the capital market construction, the pricing mechanism is increasingly incompatible with China's capital market, and various disadvantages are gradually exposed. The pricing mechanism for IPO is urgently needed. Reform.

(2) Relaxation of P/E pricing

From July 1999 to the first half of 2001, China's IPO pricing mechanism was to relax the P/E ratio. In July 1999, the Securities Regulatory Commission issued a clear provision requiring the IPO pricing mechanism to be negotiated and determined by the issuer, the lead underwriter, and the institutional investor. The CSRC will review the prices negotiated by the three parties and have the final determination power. [12]However, the issue price of new shares can exceed a certain price range. It shows that China's IPO pricing mechanism has taken a key step towards market-oriented reform.

(3) Control price-earnings ratio pricing

From the second half of 2001 to the beginning of 2005, the pricing mechanism of the IPO was at the stage of controlling the price-earnings ratio. It differs from the relaxation of the price-earnings ratio at two points: the upper and lower range of the IPO issue price is 10%; the IPO issue price-earnings ratio is not more than 20 times. Issuers and lead underwriters can only set prices within the stipulated range. The control of the price-earnings ratio has played a very important role in the construction of the capital market, which is conducive to optimizing the allocation of market resources. With the further development of the construction of the capital market, the IPO issuance pricing mechanism needs to be further deepened and reformed.

(4) Inquiry system

From the beginning of 2005 to the present, the pricing mechanism of the IPO is the inquiry system. The continued downturn in the secondary market and frequent occurrences of IPO initial market challenges the approach of controlling the price-earnings ratio, prompting the securities regulatory authorities to carry out deeper market-oriented reforms of the IPO pricing mechanism. At the end of 2004, the

[12]Source：Walters (2010)

“Notice on Several Issues Concerning the Implementation of the Inquiry System for Initial Public Offerings” issued by the China Securities Regulatory Commission clearly stipulated that the approval system for the IPO pricing mechanism should be cancelled, and the inquiry system should be formally implemented. The promulgation of the “Administrative Measures on Securities Issuance and Underwriting” in September 2006 further regulated the issues related to the IPO inquiry system, strengthened the supervision of issue applicants, underwriters, and investors to participate in the IPO pricing mechanism, and improved the IPO inquiry Price mechanism.

2.4 IPO Performance Theory

This part introduces the theory of IPO performance, and analyzes the definition and methods of IPO performance.

2.4.1 Connotation and Definition of Performance

IPO performance refers to the market performance of 3-5 years since the listing of new shares, which is divided into strong and weak. Strong IPO performance means that compared with benchmark returns (market index and similar companies in the same industry), the return of new stocks in 3-5 years is higher than the benchmark return; weak performance means that the return of new shares in 3-5 years is lower than the benchmark return It is generally believed that there are weaknesses in IPO new shares. [13]China's capital market started late, regardless of the imperfection of institutional construction and market structure. There is a large gap between the shareholding structure and investor structure in comparison with Western developed countries. Therefore, there may be inconsistent performance with Western developed countries. This thesis studies the performance of China's GEM IPO to determine whether there is a weakness? If so, to what extent? Then analyze it's influencing factors.

[13]Source：Moshirian (2010)

2.4.2 Performance Measurement Methods

There are two main methods for measuring IPO performance: event time method and calendar time method. The event time method is an empirical financial analysis method. This method assumes that the market is completely rational, and the parties involved in the market can react quickly to the impact of an event, and the stock price will also respond in a timely manner. Change to determine the impact of the event. In 1991, Ritter first used the event time method to study the performance of the US stock market, and since then this method has been widely used in the research of new stock performance. The idea of the calendar time method is to calculate the average return of a group of stocks over a certain period of time based on calendar time, and then compare it with the reference benchmark return, and then use the CAPM model and the Fama-French three-factor model to return to both. Determine the performance of the stock by determining the intercept item. Because the basic ideas of the two models are consistent, this article only uses the CAPM method for research.

2.4.3 Theoretical Explanation of Weakness

Scholars' research on the performance of new stocks in different countries and regions shows that there is a general phenomenon of weak IPO performance in the capital markets of various countries, and the explanation for this phenomenon is mainly based on the following three aspects.

(1) Earnings management hypothesis

Earnings management is a researcher's explanation of the weakness of new stocks from the perspective of information asymmetry. The representative figures are Techwelch and TJwon.[14] The hypothesis believes that due to the existence of information asymmetry, investors can only obtain companies through the prospectus. If you want to obtain more information, you need to spend a lot of money. Therefore,

[14]Source：Ber (2004)

most investors will invest based on the stock price of the company before the company's earnings.[15] As a result, the issuer may be able to beautify the company's financial data through earnings management, increase investors 'expectations of the value of its stock, and increase the issue price. At the same time, due to the existence of an issue lock-up period, the company, in order to maintain the stock at a higher price level, also the surplus management will continue to be implemented, and if investors make investments at this time, they will suffer greater losses. The hypothesis believes that the more earnings management the issuer performs, the higher its share price will be issued, and the greater the likelihood that the share price will fall after listing. The weakness of the IPO is a correction of the company's excessive share price at the time of listing.

(2) Signal hypothesis

The signal hypothesis believes that any information related to issuance such as underwriter 's reputation, company size and operating performance can be used as a signal to identify the quality of the issuing company. Comprehensive analysis of these indicators related to the quality of the company can determine the quality of the company and improve the issuer and investors. Transparency has an impact on stock performance. A research by Ritter found that the shorter the company's establishment time, the worse the performance of its new shares after listing. [16]Therefore, he believes that the more start-up companies, the less obvious their prospects and the worse the performance of new shares. The theory further believes that the quality of a company is positively correlated with the performance of new shares. The better the quality of the company, the better the performance of the stock. The weak IPO reflects the poor quality of listed companies.

(3) Financial intermediary theory

From the perspective of information economics and transaction costs, the theory emphasizes the role of financial intermediaries and believes that the existence

[15]Source：Bell (2012)

[16]Source：Kraus (2003)

of intermediaries can greatly reduce information asymmetry and transaction costs. Financial intermediaries play a role in identifying the quality of listed companies during the issuance of new shares. Good-quality companies require less packaging during the issuance and lower issuance costs; poor-quality companies require a lot of packaging before the issuance. The higher issuance costs and the weakness of new stocks is a callback to the false high stock price at the beginning of the listing.

2.4.4 Theoretical Explanation of IPO Effect

By sorting out and summarizing the above-mentioned domestic and international literature on the IPO effect, it can be seen that through the public issuance of stocks, there is a general phenomenon of decline in operating performance after the IPO operation, namely the IPO effect. This phenomenon has been confirmed to exist in the securities markets of other countries and China's A-share market. The phenomenon of financial performance decline of listed companies after IPO has certain theoretical motivations. Although there is still no unified theory to explain the reasons for the decline in operational performance after IPO, Western scholars have pointed out that the performance of companies after IPO has generally declined. The phenomenon puts forward some reasonable inferences, which mainly include the following explanations:

Earnings management is the subject of extensive research in the field of financial economics and financial accounting at home and abroad. In the field of financial accounting, earnings management can be interpreted as a targeted "disruption" of the financial reporting process in order to achieve certain private disclosure management. The success of a company’s initial stock offering and the determination of its price depend mainly on the profitability of the listed company. In most cases, the initial public offering of underwriting stocks mainly comes from the holdings of the initial shareholders, and the price of the initial public offering directly affects the wealth of the original shareholders. At the same time, the amount of profit is the most critical factor in determining the price of the initial public offering. Factors, therefore, in the case of asymmetric information, the original shareholders through the

choice of accounting policies to adjust the company's surplus, obtain a higher IPO price, thereby increasing their own wealth motive, that is, there is a motive for pre-listing earnings management. Scholars with this motive hypothesis believe that in order to obtain the highest possible IPO price in order to obtain more raised funds, the company's management exists to whitewash the company's financial statement data to increase pre-IPO earnings, which in turn changes investors' future expectations of the company The illusion of accepting the "expected" high issue price. However, any accrued items have a reversal effect, so the short-term operating performance will show a decline.

Window whitewashing theory was proposed by RAO in 1993. [17]He believes that before the company goes public, it is difficult for investors with asymmetric information to understand the company's operations, so understanding the newly listed company depends on the information accumulated on the company's prospectus. For investors, historical information about the company plays an important role. Investors usually judge risks and returns based on historical information, so as to make investment decisions. For the success of listing and more financing, corporate management may gloss over pre-IPO financial statement data and overestimate the pre-IPO accounting profits, making it difficult for the company's actual operating performance to exceed the pre-IPO level after listing, which will now become an IPO effect.

[17]Source：Renucci (2012)

3 Description of Regression Analysis

In this chapter, the methodologies which will be used to solve the statistical problem of IPO performance will be introduced. It can be divided into six parts, which are statistical analysis of data, multiple regression analysis, verification of statistical, heteroscedasticity analysis, multicollinearity analysis, and normality test. The elaboration of this part is mainly based on Hillier (2009).

3.1 Statistical Analysis of Data

In this thesis, the data analysis tool used is SPSS 25. SPSS is the world's first statistical software that uses a graphical menu-driven interface. Its most prominent feature is its extremely user-friendly interface and beautiful output. It displays almost all functions in a unified and standardized interface, uses Windows to display various management and data analysis methods, and the dialog box displays various function options. As long as users have certain Windows operation skills and are proficient in statistical analysis principles, they can use the software to serve specific scientific research work.

SPSS statistical analysis process includes descriptive statistics, mean comparison, general linear model, correlation analysis, regression analysis, logarithmic linear model, cluster analysis, data reduction, survival analysis, time series analysis, multiple response, etc. There are several statistical processes, such as regression analysis, linear regression analysis, curve estimation, logistic regression, weighted estimation, nonlinear regression and other statistical processes, and each process allows users to choose different methods and parameters. In this thesis, the method of multiple regression and descriptive statistics were used.

3.2 Multiple Regression Analysis

In this part, the relationship between quantitative variables will be introduced. The analysis of economy and businesses makes extensive use of relationships between variables. It can be express as following:

$$Y = f(X) \tag{3.1}$$

where X is referred as independent variable, which is used in a relationship to explain or to predict changes of Y, which is referred as dependent variable. The function can be linear and nonlinear forms. The aim of regression is to estimate the unknown function. And scatter plots provide a picture of the two variables by displaying data points on two-dimensional graph, where axis x is the independent variable and axis y is for dependent variable. In scatter plots, it is obvious to find the range of each variable, the possible relationship between these two variables and the indication of outliers. The most familiar methods like linear regression and ordinary least squares regression are parametric. Parametric regression function is defined in terms of a finite number of unknown parameters which are estimated from data. Nonparametric regression allows the function to lie in a specified set of functions.[18]

Changes in social and economic phenomena are often affected by multiple factors. Therefore, multiple regression analysis is generally performed. We refer to regression that includes two or more independent variables as multiple linear regression.

The basic principle and basic calculation process of multiple linear regression are the same as those of linear regression, but due to the large number of independent variables, the calculation is quite cumbersome. Generally, statistical software is needed in practical applications. Here we only introduce some basic problems of multiple linear regression.

However, because the units of each independent variable may be different, the size of the coefficient before the independent variable does not indicate the importance of the factor, so we have to find a way to convert each independent variable into a unified unit. Specifically, here is to convert all variables including dependent variables into standard scores first, and then perform linear regression. The regression coefficients obtained at this time can reflect the importance of the corresponding independent variables. The general form of the multiple linear

[18] Source：Berenson (2006)

regression model is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n + \varepsilon \quad (3.2)$$

where Y is the response variable, X is the explanatory variable, β are the estimated parameters, ε is the constant term.

When establishing a multiple linear regression model, in order to ensure that the regression model has excellent explanatory ability and predictive effect, attention should be paid to the selection of independent variables first.

(1) The independent variable must have a significant influence on the dependent variable and have a close linear correlation;

(2) The linear correlation between the independent variable and the dependent variable must be true, not formal;

(3) The independent variables should have a certain mutual exclusion, that is, the correlation between the independent variables should not be higher than the correlation between the independent variables and the dependent variables;

(4) The independent variable should have complete statistical data, and its predicted value is easy to determine.

3.3 Statistical Verification

Through the analysis of the sample data on the descriptive test, this part verifies the analysis of its data.

T-Test

T-test, normal distribution with unknown population standard deviation σ. The t-test uses the t-distribution theory to deduce the probability of the difference, so as to compare whether the difference between the two averages is significant.

The single population t-test is to test whether the difference between a sample mean and a known population mean is significant. When the overall distribution is normal, the steps are as follows:

1. Establish hypothesis and determine test level α

Null Hypothesis $H_0: \beta_i = 0(coefficient\ is\ not\ statistically\ significant)$

Alternative Hypothesis $H_1: \beta_i \neq 0(coefficient\ is\ statistically\ significant\ exist)$

Test level: α = 0.05

2. Calculate inspection statistics

$$t_{cal} = \frac{\hat{\beta_i}}{\sigma_{\hat{\beta_i}}} \sim t(n-k) \tag{3.3}$$

where $\hat{\beta_i}$ is estimated parameter, $\sigma_{\hat{\beta_i}}$ is standard deviation of parameter, n is number of observation, k is number of parameter.

3. Check the corresponding boundary value table, determine the P value, and draw conclusions.

If $/t_{cal}/ > t(n-k)$, reject H_0, and accept H_1. So we can assume this parameter is statistically significant.

If $/t_{cal}/ < t(n-k)$, reject H_1, and accept H_0. So we cannot assume this parameter is statistically significant. We can calculate $t(n-k)$ by function "TINV" in excel.

If the p-value is less than the significance level our testing, we should accept the alternative hypothesis (H_1) that this parameter is not equal to zero. If the p-value is higher than the significance level our testing, we should accept the null hypothesis (H_0) that this parameter is equal to zero.

F-Test

F-test, the most commonly used alias is called joint hypotheses test, in addition also known as variance ratio test, variance homogeneity test.

It is a test whose statistical values follow the F-distribution under the null hypothesis. It is usually used to analyze a statistical model that uses more than one parameter to determine whether all or part of the parameters in the model are suitable for estimating the parent. The steps are as follows:

1. Establish hypothesis and determine test level α

Null Hypothesis $H_0: \beta_1 = \beta_2 = \cdots = \beta_i = 0$ ($coefficient\ \ is\ \ not\ \ statistically\ \ significant$)

Alternative Hypothesis $H_1: \beta_1 \neq 0 \text{ v } \beta_2 \neq 0 \text{ v} \cdots \text{v } \beta_i \neq 0$ ($coefficient\ \ is\ \ statistically\ significant\ exist$)

Test level: $\alpha = 0.05$

2. Calculate statistics

$$F = \frac{\frac{ESS}{k-1}}{\frac{RSS}{n-k}} \sim F(k-i, n-k) \tag{3.4}$$

where ESS is explained sum of squares, RSS is residual sum of squares, n is number of observation, k is number of estimated coefficients.

3. Check the corresponding boundary value table, determine the P value, and draw conclusions.

If $F > F(k-i, n-k)$, reject H_0, and accept H_1. So we can assume the model is statistically significant.

If $F < F(k-i, n-k)$, reject H_1, and accept H_0. So we cannot assume the model is statistically significant. We can calculate $F(k-i, n-k)$ by function "FINV" in excel.

If the p-value is less than the significance level our testing, we should accept the alternative hypothesis (H_1) that not all slope coefficients are equal to zero. If the p-value is higher than the significance level our testing, we should accept the null hypothesis (H_0) that all slope coefficients are equal to zero.

3.4 Heteroscedasticity Analysis

Heteroscedasticity is relative to homoscedasticity. The so-called variance is to ensure that the regression parameter estimator has good statistical properties. An important assumption of the classical linear regression model: the random error term in the overall regression function meets the same variance, that is, they all have the same variance. If this assumption is not satisfied, that is, the random error terms have different variances, the linear regression model is said to have heteroscedasticity.

If the linear regression model has heteroscedasticity, the traditional least square method is used to estimate the model, and the obtained parameter estimator is not an effective estimator or even an asymptotically effective estimator; at this time, the model parameters cannot be significantly related test.

Heteroscedasticity can be generalized into three types:

(1) Monotonically increasing type: it increases with the increase of X, that is, in the scatter diagram of X and Y, it shows that the fluctuation of the Y value becomes larger and larger as the X value increases

(2) Monotonically decreasing type: it decreases with the increase of X, that is, in the scatter diagram of X and Y, it shows that the fluctuation of the Y value becomes smaller and smaller as the X value increases

(3) Complex type: The change with X is in a complicated form, that is, in the scatter diagram of X and Y, it shows that with the increase of X value, the fluctuation of Y value is complex and changeable, and there is no system relationship.

In this thesis, we use the white test. White test is a statistical test that establishes whether the variance of the errors in a regression model is constant. The test statistic is defined as:

$$\hat{u}_t^2 = \lambda_1 X_1 + \cdots + \lambda_k X_{k_t} + \lambda_{k+1} X_{1_t}^2 + \cdots + \lambda_{2k-1} X_{k_t}^2 + \lambda_{2k} X_{1_t} X_{2_t} + \lambda_{2k+1} X_{2_t} X_{4_t} + \cdots + \lambda_p X_{k-1_t} X_{k_t} + + \varepsilon_t (*) \quad (3.5)$$

Null Hypothesis $H_0: \lambda_1 = \lambda_2 = \cdots = \lambda_i = 0$ (homoskedasticity)

Alternative Hypothesis $H_1: \lambda_1 \neq 0 \text{ v } \lambda_2 \neq 0 \text{ v} \cdots \text{v } \lambda_i \neq 0$ (heteroscedasticity)

$$X_{computed}^2 = n \cdot R^2 \sim X^2(df) = X^2(k - 1) \quad (3.6)$$

where X^2 is the test value (CHIINV (α; df)), R^2 is R-squared in the white test, *n* is number of observation, *k* is number of estimated coefficients, $\alpha = 0.05$.

If $n \cdot R^2 > X^2$, we reject H_0, accept H_1. There is Heteroscedasticity in model.

If $n \cdot R^2 < X^2$, we accept H_0, reject H_1. There is no Heteroscedasticity in our model.

If there is heteroscedasticity in our models, we can use the Newey–West estimator to solve this problem. Newey–West estimator is used in statistics and econometrics to provide an estimate of the covariance matrix of the parameters of a regression-type model when this model is applied in situations where the standard assumptions of regression analysis do not apply.

3.5 Multicollinearity Analysis

Multicollinearity means that the explanatory variables in the linear regression model are distorted or difficult to estimate accurately due to the existence of precise correlations or high correlations.

Generally speaking, due to the limitation of economic data, improper model design leads to a universal correlation between explanatory variables in the design matrix. It is not uncommon to see complete collinearity. Generally, collinearity occurs to a certain extent, that is, approximate collinearity.

If there is complete collinearity in the linear regression model, the LS estimation of the regression coefficients does not exist. Therefore, the collinearity discussed in the linear regression analysis is mainly incomplete collinearity, also known as complex collinearity.

We can use VIF (Variance Inflation Factor) method to test correlation rate. The formula is:

$$VIF_i = \frac{1}{1-R_i^2} \tag{3.7}$$

where R_i^2 is the coefficient of determination of the regression equation.

If $VIF_i > 10$, then multicollinearity is high (a cutoff of 5 is also commonly used).

The way of remove of multicollinearity problem include: 1) Dropping a variable from the model and specification bias. 2) Transformation of variables. 3) Additional or new data. 4) Reducing collinearity in in polynomial regressions. 5) Other methods of remedying multicollinearity.

3.6 Normality Test of Residuals.

Residual is the vertical difference between the estimated regression line and the observation points, such that the sum of squares of all residuals is the smallest possible.

If we want to test the normality of residuals, we should finish the test of these assumption which are the regression model which is linear in the parameters and

correctly specified; no heteroscedasticity, no multicollinearity; the variance of residuals is constant.

In statistics, the Kolmogorov-Smirnov test (K-S test or KS test) is a nonparametric test of the equality of continuous, one-dimensional probability distributions that can be used to compare a sample with a reference probability distribution (one-sample K-S test), or to compare two samples (two-sample K-s test). In the Kolmogorov-Smirnov test, Exact Sign shows whether an exact p-value should be computed. If this value is higher than 5%, we assume the residuals are normally distributed at level of 5%. If this value is smaller than 5%, we can assume residuals are normally distributed at level of 5%.

In this thesis, we use the JB (Jarque-Bera) test:

Null Hypothesis H_0: Residuals are normal distribution

Alternative Hypothesis H_1: Residuals are not normal distribution

$$JB = n \cdot \left[\frac{S^2}{6} - \frac{(k-3)^2}{24}\right] \sim x^2(df) \tag{3.8}$$

where S is skewness, K is means kurtosis, n is number of observation, k is number of estimated coefficients.

If $JB < x^2(df)$ we accept H_0, reject H_1. Residuals are normal distribution.

If $JB > x^2(df)$ we reject H_0, accept H_1. Residuals are not normal distribution.

4 Performance Evaluation of Selected IPOs

The IPO of new stocks on the Shanghai Stock Exchange performed poorly during first three years, and its return rate was much lower than that of the market index during the same period, and there was a serious weakness. This chapter selects the relevant factors from the three aspects of company characteristics, issuance characteristics and secondary market characteristics of the new stock portfolio, and uses multiple regression methods to study the impact of the selected factors on the performance of new stocks.

4.1 Data Sources and Data Selection

This section introduces the source of the data and the sample selection of the data.

4.1.1 Data Sources

The data sample for the purposes of our analysis comprises companies that were first listed on the Shanghai Stock Exchange from 2009 to 2016. The data comes from the "Shanghai Stock Exchange Database". The closing price of the sample company's normal trading day for three consecutive years after listing and the relative market index closing price data were selected to measure the performance of the IPO. The data on the influencing factors also came from the database.

4.1.2 Data Selection

The sample selection is based on the following points:

(1) The research on stock performance is generally selected for 3-5 years. Considering the particularity of the Shanghai Stock Exchange, the number of stocks is limited. An excessively long research period will lead to a large reduction in sample data.

(2) Taking into account the continuity of the transaction date, excluding stocks that have been continuously suspended for more than 2 months during the inspection

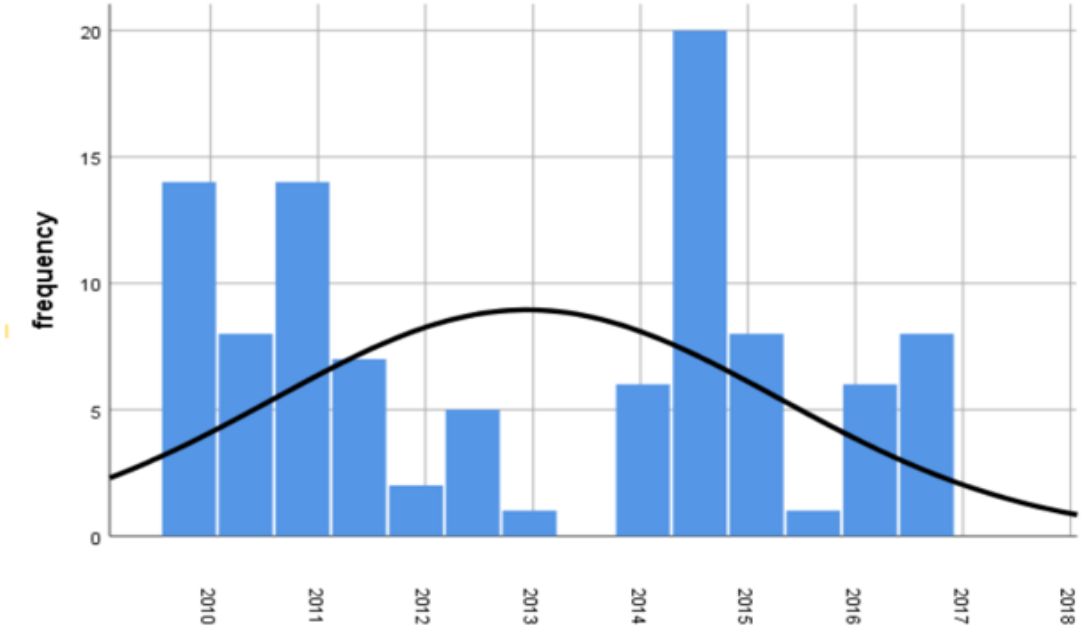
period, the research sample in this paper includes 100 stocks.

(3) In order to avoid the impact of the ultra-high yield on the first day, this thesis takes the first day's closing price as the basis and observes from the second trading day after the new stock is listed. Except for holidays, there are about 240 trading days in a year in China, and the 21 consecutive normal trading days after the listing of the stock are a trading month, that is, the 2-22th normal trading day after the listing is the first trading month, the 23rd- The 43 normal trading days are the second trading month, and so on. Therefore, the three-year performance data of new shares in the thesis is the normal three years of trading of new shares, rather than the three years understood in real life.

4.2 Descriptive Statistics of Sample Companies

This thesis selected IPO-related data of 100 companies listed on the Shanghai Stock Exchange from 2009 to 2016, the input data can be seen in Annex 1-4. The sample company's listing year statistics are as Figure 4.1.

Figure 4.1 Statistics of IPO Time of Sample Companies



Source: Own calculation

In this thesis, a number of indicators of these 100 companies were considered, namely the issue price, opening price, closing price, number of issues, price after one

year, and price after three years. The sum of data sample description can be found in Annex 5. Here, descriptive statistics are used to count these indicators.

Table 4.1 Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Standard deviation	Variance
Issue price	100	49.57	1.68	51.25	12.0638	8.21368	67.465
Open price	100	59.48	2.02	61.50	15.2550	9.76452	95.346
Close price	100	63.99	2.42	66.41	16.3763	10.34926	107.107
Number of share	100	2,221,894.40	1,635.00	2,223,529.40	73,566.1523	260,875.60417	6,805.380
One years later price	100	56.93	2.70	59.63	15.9135	11.62815	135.214
Three years later price	100	41.02	2.10	43.12	13.8179	8.57091	73.460

Source: Own calculation

It can be seen from the Table 4.1 that the average value of the stock price after three years is lower than the stock price after one year. In general, from the above statistical results, the performance of new shares seems to be negatively correlated with the size of the company, but the precise results need further verification. The reason for this phenomenon may be the particularity of the listed company itself. Most of the companies listed on the Shanghai Stock Exchange are in the early stages of development, and it is impossible to have a large scale. At the same time, the industries in which some high-tech companies are located are in the development stage. These companies are listed to raise funds and expand their scale. Therefore, the performance of IPO new shares is negatively correlated with the size of the company, but the excessive size has become a signal of poor company quality. In the face of the same listing requirements, small-scale enterprises can meet the same profitability at a smaller scale, and the company develops steadily, has a better ability to create cash, compared with large companies under the same conditions, new shares perform better.

4.2.1 Independent Variables Analysis

In this thesis, we selected eight independent variables. The independent

variables include return on equity (ROE), net profit, earnings per share (EPS), capital, interest rate, GDP, inflation, and stock market index. The next section shows the descriptive statistics of these independent variables. In addition, there are some financial indicators. All the variables are collected three years after the initial public offering.

Return on Equity

The return on net assets is the percentage of net profit to average shareholders' equity, which is the percentage of the company's after-tax profits divided by net assets. This indicator reflects the level of return on shareholders' equity and is used to measure the company's efficiency in using its own capital. The higher the indicator value, the higher the return on investment. This indicator reflects the ability of own capital to obtain net income.

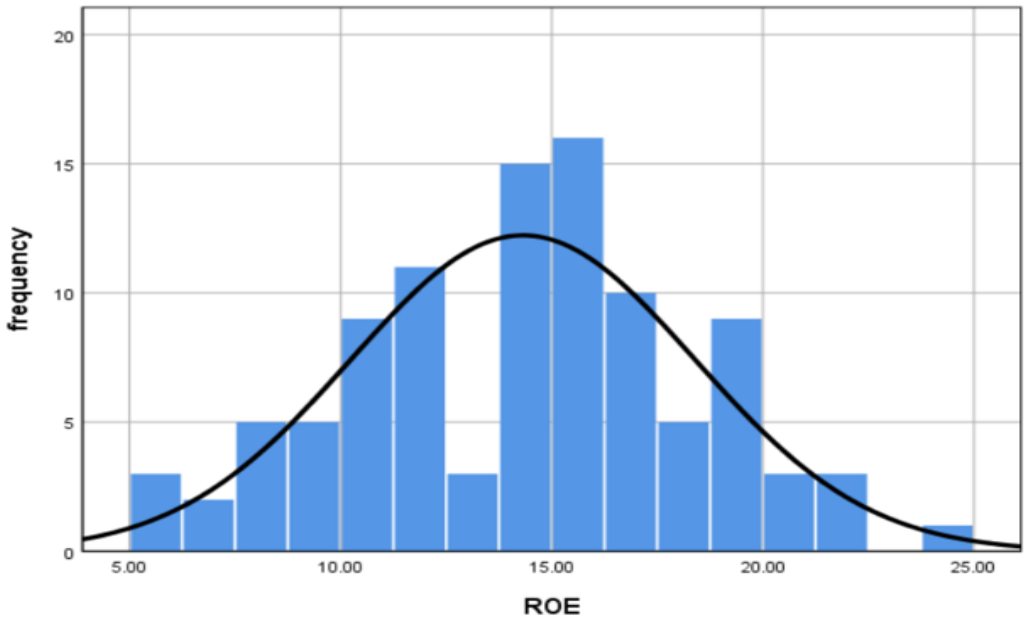
Corporate assets include two parts, one is the investment of shareholders, that is, the owner's equity (it is the sum of share capital invested by shareholders, corporate provident fund and retained earnings, etc.), and the other is the funds borrowed and temporarily occupied by the company. Appropriate use of financial leverage by an enterprise can improve the efficiency of the use of funds. Too much borrowed funds will increase the financial risk of the enterprise, but generally it can improve profitability. Too little borrowed funds will reduce the efficiency of the use of funds. The return on net assets is an important financial indicator that measures the efficiency of shareholders 'use of funds. The following figure shows the ROE statistics of 100 companies in this thesis:

Table 4.2 ROE Descriptive Statistic

Effective	100
Missing	3
Average value	14.3180
Standard deviation	4.07741
Variance	16.625
Skewness	-0.127
Standard error of amplitude	0.241
Kurtosis	-0.388
Kurtosis standard error	0.478
Min	5.31
Max	24.36
Sum	1431.80

Source: Own calculation

Figure 4.2 ROE Distribution



Source: Own calculation

Through statistical analysis, it can be seen from Table 4.2 and Figure 4.2 that the ROE of most companies is concentrated between 10%-20%, and individual companies are less than 10% and more than 20%. Among the selected 100 companies, the average ROE is 14.318%. From the skewness, it can be seen that the ROE of 100 companies is less dispersed. The rate of return on net assets can measure the company's efficiency in using capital invested by shareholders.

Net profit

Net profit refers to the amount of the company's current profit minus income tax, that is, the company's after-tax profit. Income tax refers to the tax paid by the enterprise to the state in accordance with the standards stipulated by the income tax law. It is a deduction item for total corporate profits.

It refers to the retained profits of the company after the income tax has been paid in accordance with the provisions in the total profit, and is generally also called after-tax profit or net profit. The amount of net profit depends on two factors, one is the total profit, and the other is the income tax expense.

The calculation formula of net profit is:

$$\text{net profit} = \text{total profit} - \text{income tax expense} \quad (4.1)$$

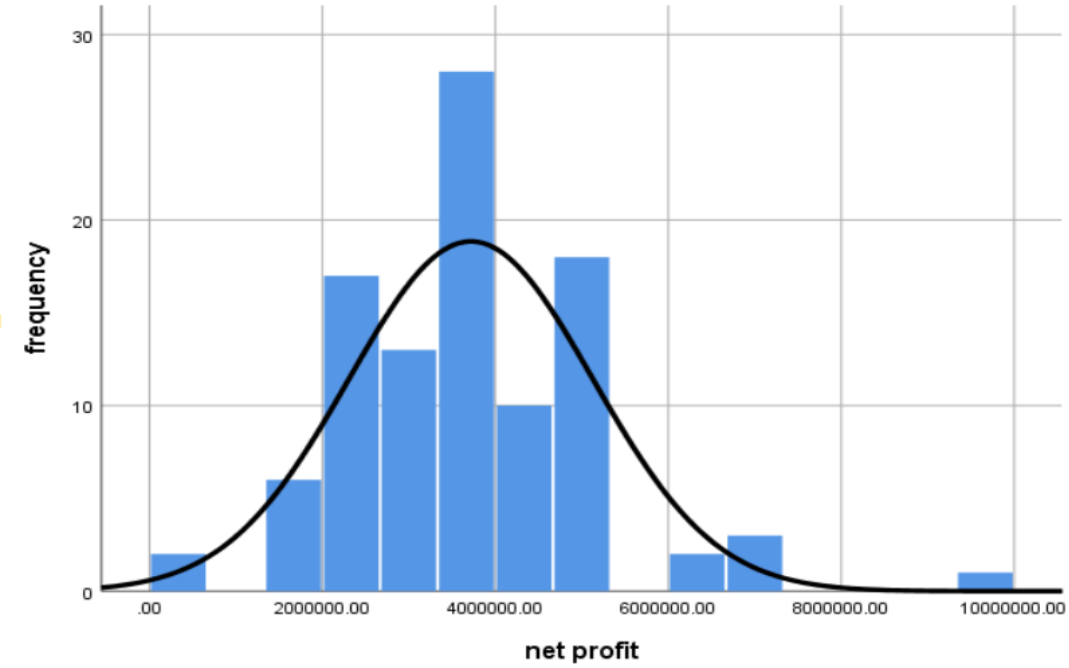
Net profit is the final result of an enterprise 's operation. If there is more net profit, the enterprise 's operating efficiency is better. The main indicator to measure the operating efficiency of an enterprise. The following chart shows the net profit statistics of 100 companies in this thesis:

Table 4.3 Net Profit Statistics

Effective	100
Missing	3
Average value	3716385.3424
Standard deviation	162.99829
Variance	198.607
Skewness	0.742
Standard error of amplitude	0.241
Kurtosis	2.577
Kurtosis standard error	0.478
Min	108267.02
Max	9526413.60
Sum	371638534.24

Source: Own calculation

Figure 4.3 Net Profit Distribution



Source: Own calculation

Through statistical analysis, it can be seen from Table 4.3 and Figure 4.3 that the net profit of most companies is concentrated between 2 million yuan and 5 million yuan, and only a few companies have a net profit within 2 million yuan and more than 6 million yuan. Among the 100 companies selected, the average net profit was 3716385.3424yuan. As can be seen from the skewness, the return on net assets of 100 companies is relatively low. Net profit is the final result of an enterprise's operation. If there is more net profit, the enterprise's operating efficiency will be good, if there is less net profit, the enterprise's operating efficiency will be worse.

Earnings per share

Earnings per share (EPS), also known as after-tax profit per share and earnings per share, refers to the ratio of after-tax profit to total equity. Ordinary stock shareholders can enjoy the net profit of the company or the net loss of the company for every share they hold. Earnings per share are usually used to reflect the company's operating results, measure the profitability of common stocks and investment risks, and are used by investors to evaluate corporate profitability, predict corporate growth potential, and then make relevant economic decisions.

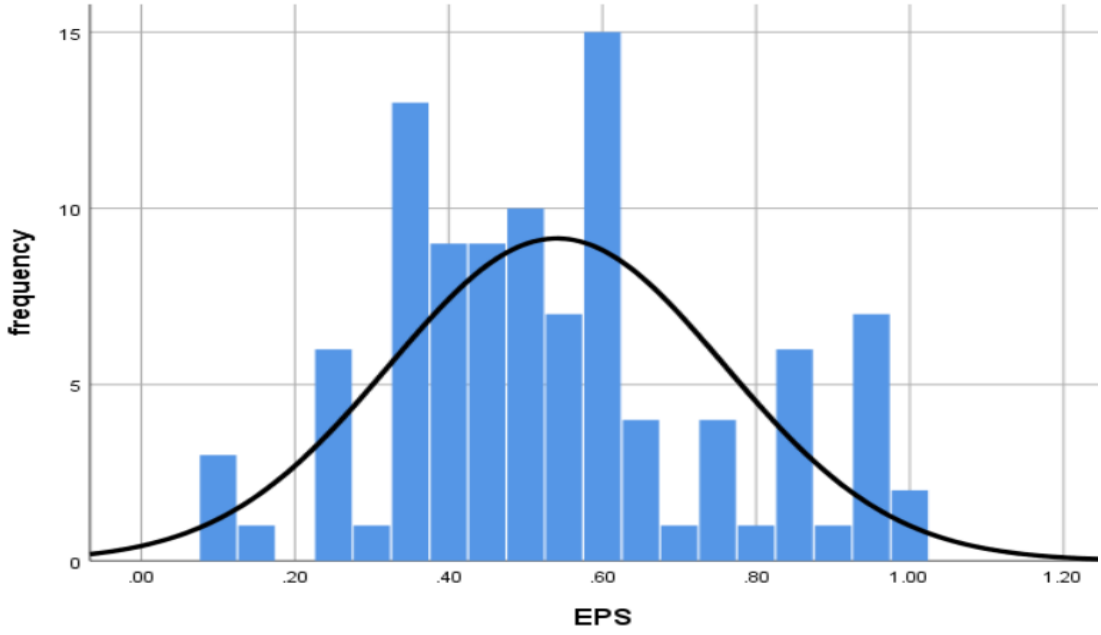
The following chart shows the earnings per share statistics of 100 companies in this thesis:

Table 4.4 EPS Statistics

Effective	100
Missing	3
Average value	0.5408
Standard deviation	0.21806
Variance	0.048
Skewness	0.363
Standard error of amplitude	0.241
Kurtosis	-0.349
Kurtosis standard error	0.478
Min	0.01
Max	0.98
Sum	54.08

Source: Own calculation

Figure 4.4 EPS Distribution



Source: Own calculation

Through the Table 4.4 and Figure 4.4, we can find that the average value of earnings per share in the 100 sample companies is 0.5408yuan. Overall, the sample data are mostly concentrated between 0.2-0.8yuan. There are also a few companies whose earnings per share are greater than 0.8yuan, or even more than 1yuan, but overall, the data is relatively concentrated.

Capital

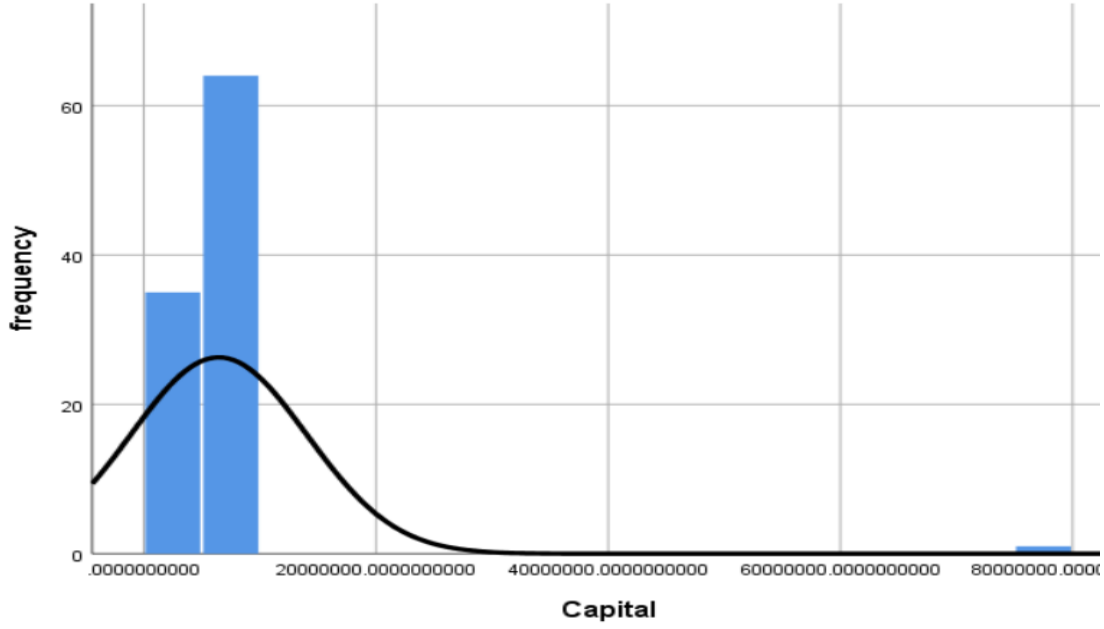
Paid-in capital refers to various assets invested by the investor as capital in the enterprise, and is the source of the total legal capital registered by the enterprise. It shows the owner's basic ownership relationship with the enterprise. The composition ratio of paid-in capital is the main basis for enterprises to distribute profits or dividends to investors. The following is the data distribution of the 100 sample companies selected in this thesis:

Table 4.5 Capital Statistics

Effective	100
Missing	3
Average value	6453777.2
Standard deviation	7583386.591669172
Variance	57507752198707.780
Skewness	8.843
Standard error of amplitude	0.241
Kurtosis	84.832
Kurtosis standard error	0.478
Min	305806
Max	78596325
Sum	645377721.31

Source: Own calculation

Figure 4.5 Capital Distribution

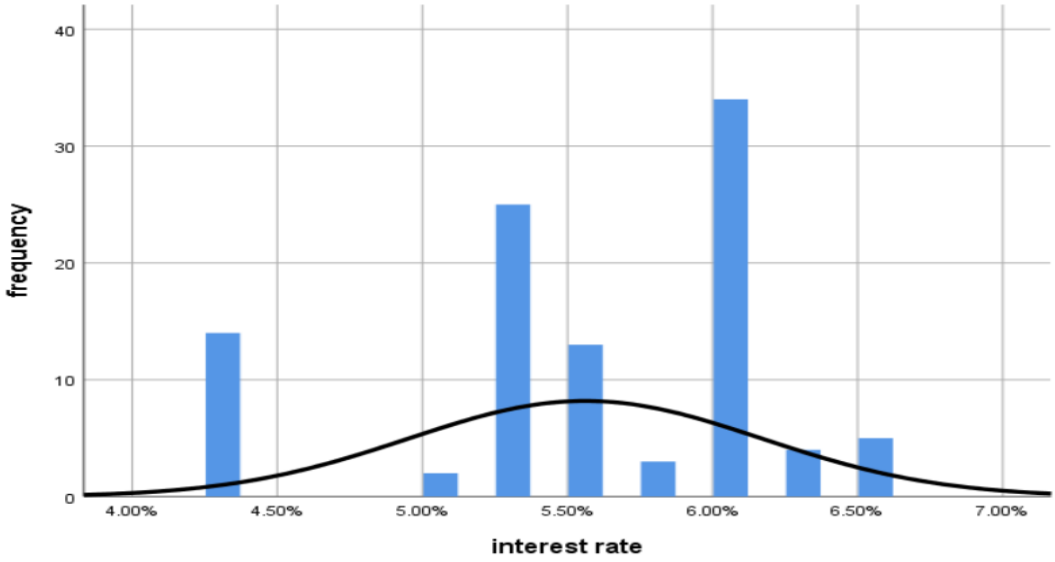


Source: Own calculation

Through the Table 4.5 and Figure 4.5, it can be found that the average value of capital in the 100 sample companies is 6453777.2yuan. Overall, the sample data are mostly concentrated at about 15 million yuan, and only very few companies reached 80 million yuan. But overall, the data is relatively concentrated.

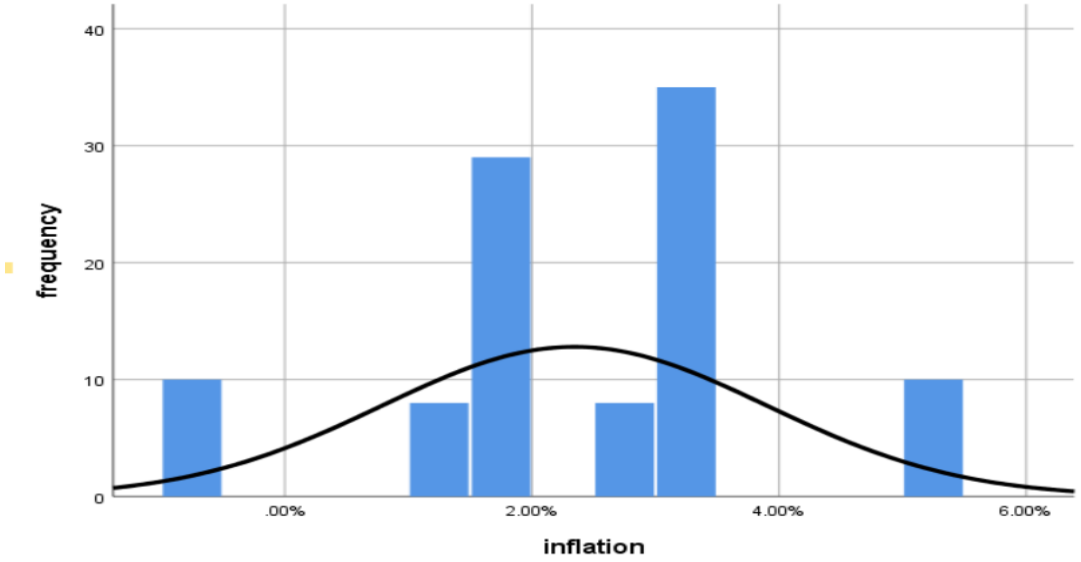
The four indicators of interest rate, GDP, inflation rate, and stock market index are not within the control of the 100 sample companies surveyed in this study. Therefore, these four indicators are counted independently in this section. The statistics of the four indicators are as follows:

Figure 4.6 Interest Rate Distribution



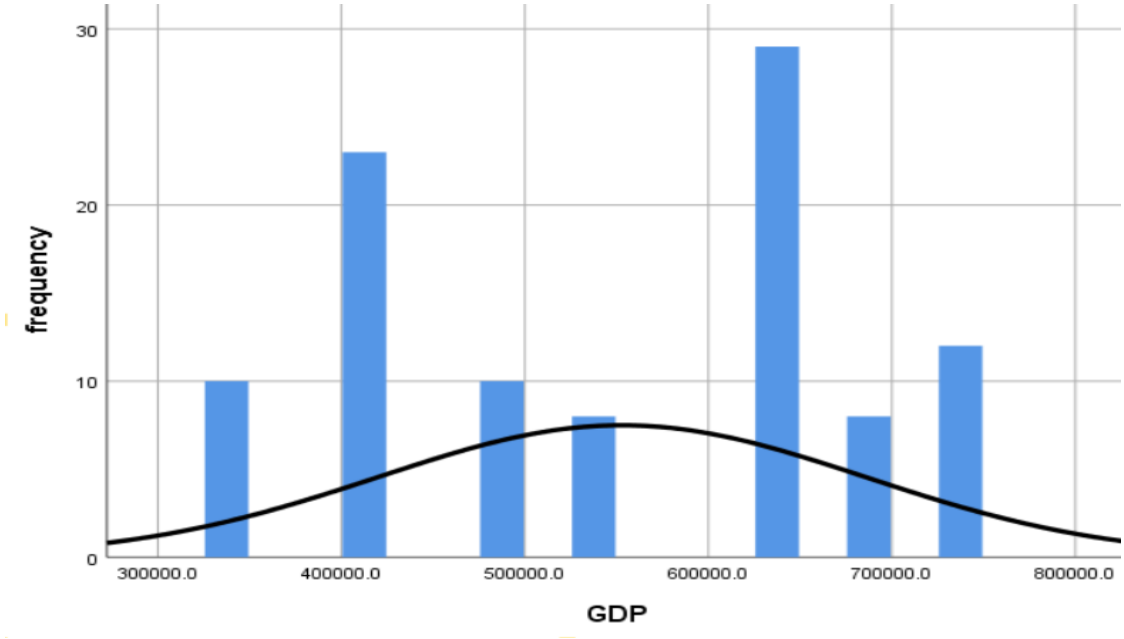
Source: Own calculation

Figure 4.7 Inflation Distribution



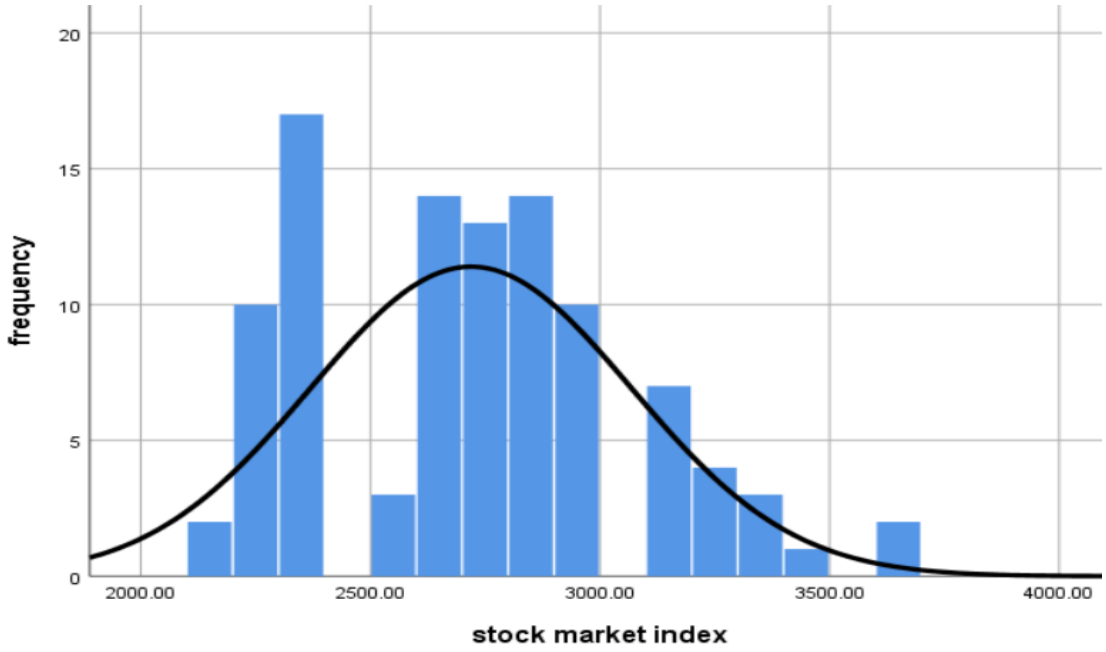
Source: Own calculation

Figure 4.8 GDP Distribution



Source: Own calculation

Figure 4.9 Shanghai Stock Market Index Distribution



Source: Own calculation

Through the above statistics on the four indicators of interest rate, inflation, GDP, and stock market index in Figure 4.6-4.9, we can see their distribution. Because the concentration of these data is related to the macro situation of the year, it cannot be judged.

4.2.2 Dependent Variable Analysis

In this thesis, the dependent variable is the three years later price of stock. Stock price refers to the price of stocks when they are bought and sold on the stock market. The stock itself has no value, it is just a certificate. The reason for its price is that it can bring dividend income to its holders, so buying and selling stocks is actually buying or selling a voucher for receiving dividend income. The par value is the basis for participating in the company's profit distribution, the dividend level is the ratio of a certain amount of share capital to the realized dividend, and the interest rate is the interest rate level of monetary capital. The buying and selling price of stocks, that is, the level of the stock market, directly depends on the amount of dividends and the level of bank deposit interest rates. It is directly affected by supply and demand, which is also affected by many factors inside and outside the stock market, thereby

causing the stock market to deviate from its par value. For example, the company ’s operating conditions, reputation, development prospects, dividend distribution policies, and external business cycle changes, interest rates, money supply, and national political, economic, and major policies are potential factors that affect stock price fluctuations. The trading volume, trading methods and trader composition, etc. can cause short-term fluctuations in stock prices. In addition, artificially manipulating stock prices will also cause fluctuations in stock prices.

Stock prices are divided into theoretical prices and market prices. The theoretical price of the stock is not equal to the market price of the stock, and there is even a considerable gap between the two. However, the theoretical price of stocks provides an important basis for predicting the trend of stock market prices and is also a basic factor in the formation of stock market prices.

The market price of a stock is the price at which the stock is bought and sold on the stock market. The stock market can be divided into an issuance market and a circulation market. Therefore, the market price of a stock also has a distinction between an issuance price and a circulation price. The issue price of a stock is the price negotiated between the issuing company and the securities underwriter. There are three situations for determining the stock issue price:

(1) The issue price of a stock is the face value of the stock.

(2) The issue price of the stock is determined based on the price of the stock in the circulation market.

(3) The issuance price of the stock is between the face value of the stock and the market circulation price, which is usually adopted when the original shareholder's share placement is paid. The reference formula for determining the stock issue price in the international market is[19]:

[19] Source: Bhuptani (2013)

$$Stock\ issuance\ price\ =\ price - earnings\ ratio\ reduction\ value\ \times\ 40\%\ +\ dividend\ reduction\ rate\ \times\ 20\%\ +\ net\ value\ per\ share\ \times\ 20\%\ +\ estimated\ dividend\ and\ current\ one - year\ deposit\ interest\ rate\ reduction\ value\ \times\ 20\% \quad (4.2)$$

This formula comprehensively considers several factors that affect the price of stock issuance, such as interest rates, dividends, and stock prices in the circulation market, which are worthy of reference.

The price of the stock in the circulation market is the market price of the stock in the full sense, and is generally called the stock market price or stock market. The market price of stocks takes the form of opening price, closing price, highest price and lowest price.

The closing price is the most important, which is the basic data used in analyzing the stock market.

4.3 Linear Regression Model

Based on the impact of many factors on the changes in the operating performance of listed companies on the Shanghai Stock Exchange after the IPO, in order to accurately measure the role of the relevant quota variables in this section, this section is based on the previous analysis of the changes in the operating performance of China's listed companies before and after the IPO. At the same time, combined with domestic and foreign research results and the development status of the GEM, the stock price after three years is selected as the explanatory variable, and the multiple variables of the sample companies are used as the control variables to build a regression model. Considering that both interest rate and inflation rate are expressed as percentages, while the number of net profit is much higher that is in thousands of yuan. In order to eliminate the difference, we use logarithm to transform three years later price, net profit, capital, GDP, and stock market index. We can estimate the logarithm regression model as follow:

$$lnY = \beta_0 + \beta_1 X_1 + \beta_2 lnX_2 + \beta_3 X_3 + \beta_4 lnX_4 + \beta_5 X_5 + \beta_6 lnX_6 + \beta_7 X_7 + \beta_8 lnX_8 + \varepsilon \quad (4.3)$$

Y: In order to more systematically reflect the IPO performance of the research sample, this thesis analyzes the price of the listed company's stock three years later as an indicator.

X_1: ROE, the percentage of the company's after-tax profits divided by net assets. This indicator reflects the level of return on shareholders' equity and is used to measure the company's efficiency in using its own capital. The higher the indicator value, the higher the return on investment. This indicator reflects the ability of own capital to obtain net income. Generally speaking, an increase in debt will cause an increase in the rate of return on net assets. Enterprise assets include two parts, one part is the investment of shareholders, that is, the owner's equity (it is the total share capital invested by shareholders, corporate provident fund and retained earnings, etc.

X_2: Net profit, the amount of the company's current profit minus income tax, that is, the company s after-tax profit.

X_3: EPS, refers to the ratio of after-tax profit to the total share capital. Ordinary stock shareholders can enjoy the net profit of the company or the net loss of the company for every share they hold.

X_4: Paid-in capital, refers to the capital actually received by the enterprise and invested by investors.

X_5: Interest rate, refers to the ratio of the amount of interest to the amount of borrowed funds in one year.

X_6: GDP refers to the final result of the production activities of all resident units of a country (or region) in a certain period calculated at the national market price.

X_7: Inflation rate, the annualized percentage change in a general price index, usually the consumer price index, over time.

X_8: Stock market index, a reference number prepared by a stock exchange or financial service institution that indicates changes in the Shanghai Stock Exchange Market for reference (SSEC).

Table 4.6 Regression of Basic Model

Source	SS	df	MS	Number of obs	=	100
				F(8, 91)	=	6.24
Model	15.9201871	8	1.99002339	Prob > F	=	0.0000
Residual	29.0266839	91	.318974548	R-squared	=	0.3542
				Adj R-squared	=	0.2974
Total	44.946871	99	.454008798	Root MSE	=	.56478

lnThreeyearslate~e	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ROE	-1.072265	1.459504	-0.73	0.464	-3.97139	1.826859
lnNetprofit	.2108083	.1309155	1.61	0.111	-.0492394	.4708559
EPS	.3083919	.2727341	1.13	0.261	-.2333609	.8501447
lnCapital	-.0187648	.1295141	-0.14	0.885	-.2760286	.2384989
Interest	23.34255	10.99745	2.12	0.037	1.497466	45.18764
lnGDP	1.466901	.2839113	5.17	0.000	.9029464	2.030856
Inflation	-6.802242	3.757327	-1.81	0.074	-14.26571	.6612271
lnStockmarketindex	.1504046	.5380062	0.28	0.780	-.9182786	1.219088
_cons	-22.14547	6.910218	-3.20	0.002	-35.87177	-8.419174

Source: Own calculation

Through the analysis of the goodness of fit of the regression model in the above table, it can be seen from Table 4.6 that the R-squared value and Adj R-squared value are less than 0.4, which is not good, but the significant level is good. Based on the estimated coefficients, we can express the model as follows:

$$lnY = -22.15 - 1.07X_1 + 0.21lnX_2 + 0.31X_3 - 0.02lnX_4 + 23.34X_5 + 1.47lnX_6 - 6.8X_7 + 0.15lnX_8 \quad (4.4)$$

From the Table 4.6 and formula (4.4), we can see return on equity (ROE), logarithm of capital, and inflation have negative relationship with the logarithm of stock price in three years later of IPO. While logarithm of net profit, earning per share (EPS), interest rate, logarithm of gross domestic product (GDP) and stock market index have positive relationship with dependent variable. For example, the slope coefficient of return on equity (ROE) is -1.07, which means the logarithm of price will decrease 1.07 units when the ROE increased by 1 unit.

4.4 Statistical Verification of the Parameters and Models

In this part, we will verify the model established in the previous part. This department has selected the method of T-test and F-test to study the accuracy of the model.

4.4.1 T-test Verification

Through the descriptive statistical methods for data in the previous section, t-test was performed on the relevant models and data analysis.

$H_0 : \beta_i = 0$ ($coefficient\ is\ not\ statistically\ significant$)

$H_1 : \beta_i \neq 0$ ($coefficient\ is\ statistically\ significant\ exist$)

Table 4.7 Significance Test of Basic Model

Parameter	Variables	P-value	Result	Decision	Significant
β_1	ROE	0.464	$P > 0.05$	Reject H_1, Accept H_0	No
β_2	lnNet profit	0.111	$P > 0.05$	Reject H_1, Accept H_0	No
β_3	EPS	0.261	$P > 0.05$	Reject H_1, Accept H_0	No
β_4	lnCapital	0.885	$P > 0.05$	Reject H_1, Accept H_0	No
β_5	Interest rate	0.037	$P < 0.05$	Reject H_0, Accept H_1	Yes
β_6	lnGDP	0.000	$P < 0.05$	Reject H_0, Accept H_1	Yes
β_7	Inflation	0.074	$P > 0.05$	Reject H_1, Accept H_0	No
β_8	lnStock market index	0.78	$P > 0.05$	Reject H_1, Accept H_0	No

Source: Own calculation

As can be seen from the Table 4.7, just interest rates and logarithm of GDP have significant effects on the logarithm of three years later stock prices in model (4.4). The p-values of ROE, lnnet profit, EPS, lncapital, inflation and lnstock market index are all higher than 0.05. In order to make all variables are significant, we only select the four variables of previous model, which are lnnet profit, interest rates, lnGDP and inflation, to build a new model.

Table 4.8 Regression of New Model

Source	SS	df	MS	Number of obs	=	100
				F(4, 95)	=	12.29
Model	15.3286205	4	3.83215513	Prob > F	=	0.0000
Residual	29.6182505	95	.311771058	R-squared	=	0.3410
				Adj R-squared	=	0.3133
Total	44.946871	99	.454008798	Root MSE	=	.55836

lnY	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnNetPprofit	.2154604	.0987618	2.18	0.032	.0193934	.4115274
Interest	19.79207	9.31363	2.13	0.036	1.302178	38.28196
lnGDP	1.348921	.2266359	5.95	0.000	.8989916	1.79885
Inflation	-7.241019	3.629845	-1.99	0.049	-14.44717	-.0348664
_cons	-19.54026	3.230536	-6.05	0.000	-25.95368	-13.12683

Source: Own calculation

Based on the Table 4.8, we can express the model as follows:

$$ln(Y) = 0.22 \cdot ln(Net\ profit) + 19.79 \cdot Interest + 1.35 \cdot ln(GDP) - 7.24 \cdot Inflation - 19.54 \quad (4.5)$$

Table 4.9 Significance Test of New Model

Parameter	Variables	P-value	Result	Decision	Significant
β_1	lnNet profit	0.032	$P < 0.05$	Reject H_0, Accept H_1	Yes
β_2	Interest rate	0.036	$P < 0.05$	Reject H_0, Accept H_1	Yes
β_3	lnGDP	0.000	$P < 0.05$	Reject H_0, Accept H_1	Yes
β_4	Inflation	0.049	$P < 0.05$	Reject H_0, Accept H_1	Yes

Source: Own calculation

As can be seen from the Table 4.9, lnnet profit, interest rates, lnGDP, and inflation all have significant effects on the logarithm of three years later stock prices. Although the R-squared value and Adj R-squared value of new model still low, the p-values of these are all less than 0.05.

4.4.2 F-test Verification

Through the establishment of multiple regression models, we estimate the logarithm of net profit, interest rate, logarithm of GDP, and inflation rate. The stock price of the company three years after the initial public offering model, this part verifies the model (4.5) by means of F-test.

$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$

$H_1 : \beta_1 \neq 0 \vee \beta_2 \neq 0 \vee \beta_3 \neq 0 \vee \beta_4 \neq 0$

n = 100, k = 5, α = 0,05, ESS =15.33, RSS = 29.62.

$$F = \frac{\frac{ESS}{k-1}}{\frac{RSS}{n-k}} = \frac{\frac{15.33}{4}}{\frac{29.62}{95}} = 12.29 \quad (4.6)$$

$$F_{0.05}(4,95) = 2.47 \quad (4.7)$$

Through the analysis of the Table 4.8, it can be seen that the number of observation is 100, the number of estimated coefficients is 5, the explained sum of squares (ESS) is 15.33, the residual sum of squares (RSS) is 29.62, the significance of the F-test amount is 0.000 <0.05, and $F > F_{0.05}(8,91)$. For the result, we reject H_0, accept H_1, so that this new regression model is statistically significant at 0.05 level.

4.4.3 Heteroscedasticity Verification

A collection of random variables is heteroscedastic means there are subpopulations that have different variabilities from others. Heteroscedasticity is the absence of homoscedasticity. In this section, we can use white's test to detect heteroscedasticity in our multiple regression model.

White test is a parametric test based on auxiliary regression that measures the dependence of one variable (unstandardized residual) on other variables. We will first prepare a new regression model.

$$\hat{u}_t^2 = \lambda_1 X_{1_t} + \cdots + \lambda_k X_{k_t} + \lambda_{k+1} X_{1_t}^2 + \cdots + \lambda_{2k-1} X_{k_t}^2 + \lambda_{2k} X_{1_t} X_{2_t} + \lambda_{2k+1} X_{2_t} X_{4_t} + \cdots + \lambda_p X_{k-1_t} X_{k_t} + \varepsilon_t (*) \quad (4.8)$$

$H_0 : \lambda_1 = \lambda_2 = ... = \lambda_p = 0$ (homoskedasticity)

$H_1 : \lambda_1 \neq 0 \vee \lambda_2 \neq 0 \vee ... \vee \lambda_p \neq 0$ (heteroskedasticity)

Table 4.10 White's Test of New Model

```
White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(14)     =     13.07
         Prob > chi2  =    0.5213

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	13.07	14	0.5213
Skewness	1.82	4	0.7689
Kurtosis	3.24	1	0.0719
Total	18.13	19	0.5140

Source: Own calculation

As can be seen from the Table 4.10, the p-value is 0.5213, it's higher than 0.05. So, we reject H_1, accept H_0. It means that there is homoskedasticity of residuals at 5% level of significance.

4.4.4 Multicollinearity Verification

Multicollinearity refers to a situation where a number of independent variables in a multiple regression model are closely correlated to one another. Assumption of classical regression model is that among the regressors included in the regression model is no multicollinearity. It means that there is no "perfect" linear relationship among some or all explanatory variables of regression model. We don't want multicollinearity in our model.

Table 4.11 Correlation of New Model

	lnY	lnNetP~t	Interest	lnGDP	Inflat~n
lnY	1.0000				
lnNetPprofit	0.2424	1.0000			
	0.0151				
Interest	0.0991	-0.0193	1.0000		
	0.3266	0.8486			
lnGDP	0.5087	0.1549	-0.1269	1.0000	
	0.0000	0.1239	0.2084		
Inflation	-0.1264	0.1034	0.0720	0.0179	1.0000
	0.2100	0.3059	0.4763	0.8596	

Source: Own calculation

From Table 4.8 and Table 4.11, we can see the positive and negative of correlation is consistent with β coefficient from regress table. In this section, we can use VIF (Variance Inflation Factor) method to test correlation rate.

Table 4.12 VIF of New Model

Variable	VIF	1/VIF
lnGDP	1.04	0.960535
lnNetPprofit	1.04	0.965835
Interest	1.02	0.978320
Inflation	1.02	0.983696
Mean VIF	1.03	

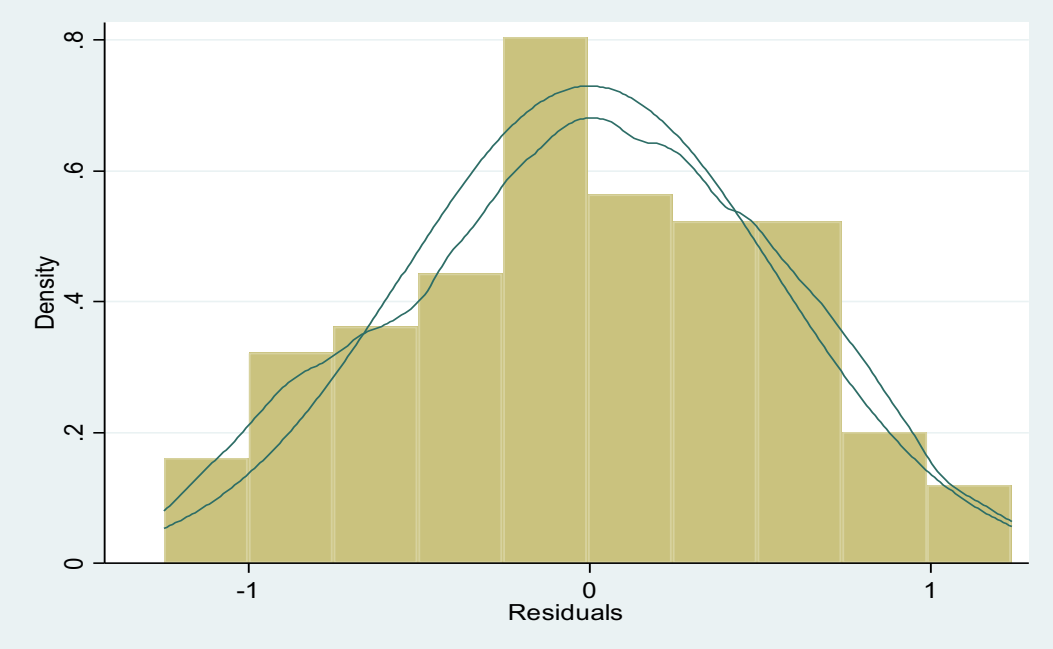
Source: Own calculation

It can be seen from the above multicollinearity test in Table 4.12 that the index of multiple variables in the regression model is less than 10. It can be concluded that there is no multicollinearity in this model.

4.4.5 Normality of residuals

First, we will make graphical test.

Figure 4.10 Histogram Residual and Normal Distribution



Source: Own calculation

We can see from Figure 4.10 that the skewness of distribution of residuals is not

so close to zero. And the kurtosis is positive. We have light-tails. And then we use the Jarque-Bera (JB-test).

Table 4.13 JB Test of New Model

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint adj chi2(2)	joint Prob>chi2
residua	100	0.6405	0.1738	2.12	0.3464

Source: Own calculation

H_0 : residuals are normal distributed

H_1 : residual are not normal distributed

$$JB = n \cdot \left[\frac{s^2}{6} + \frac{(k-3)^2}{24}\right] \sim \chi2(2) = 40.19 \quad (4.9)$$

$$\chi2(2) = \text{CHIINV}(0.05,2) = 5.99 \quad (4.10)$$

According to the calculation $JB > \chi2(2)$, we reject H_0, residual are not normal distributed at significant level of 0.05.

4.5 Summary

After researching the Shanghai Stock Exchange IPO, this thesis draws the following conclusions and explanations: First, there is a clear IPO underpricing on the issue date. According to Table 4.1 and Annex 1, the issue prices of 100 selected IPOs are lower than their open price and close price.

In addition, the logarithm of stock price can be influenced by variances such as logarithm of net profit, interest rate, logarithm of GDP, and inflation. The inflation has negative relationship with logarithm of stock price in three years later of IPO. While logarithm of net profit, interest rate and logarithm of gross domestic product (GDP) have positive relationship with dependent variable.

Finally, we get a financial model of IPO pricing after three years, which is:

$$ln(Three\ years\ later\ price) = 0.22 \cdot ln(Net\ profit) + 19.79 \cdot Interest + 1.35 \cdot ln(GDP) - 7.24 \cdot Inflation - 19.54 \quad (4.11)$$

Based on the statistical verification of the parameters and models, we know that this model is significant, homoskedasticity, no multicollinearity, and residual are not normal distributed.

Judging from the changes in multiple variable indicators reflecting the overall sample performance, it shows that the listing has not brought about the improvement of the company's operating performance. At least in the short term, the performance of listed companies has shown a downward trend, which may reflect the allocation of financing resources of listed companies. Inadequate aspects and unreasonable use of funds, some enterprises have a waste of resources in financing.

The thesis found that the listed company's logarithm of net profit, interest rate, and other related indicators have a certain impact on the logarithm of stock price changes. Taking the GDP as an example, the higher the GDP, the higher the citizens' income, and investors would have more investment funds, which will increase the company's stock price.

According to the above analysis, this thesis combines the research status of the small to medium-sized enterprise board and the above empirical research conclusions and makes the following suggestions: Listed companies should build a strict information disclosure and approval system when issuing new shares, and strengthen the responsibilities of intermediaries. No matter the overall performance of the market or the individual performance of different types of sample groups, the operating performance of IPO companies shows a continuous downward trend before and after listing. If this downward trend continues to spread, it will definitely interfere with the overall stability, thereby increasing the investment risk of investors. This thesis believes that a reasonable, strict and efficient information disclosure and audit system should be established to speed up the marketization process of the IPO system, enhance the sense of responsibility of intermediaries in the TPO process of GEM, and increase the corresponding punishment; strict supervision of intermediaries and improve litigation The timeliness and rationality of the mechanism and compensation mechanism improve the professional standard and ethical standards of intermediaries to ensure their rationality and fairness in financial statements and profit forecasts. To a certain extent, the IPO effect is weakened, the legal interests of investors are better protected, and stable development is achieved.

5. Conclusion

Initial public offering (IPO) is a type of public offering in which shares of a company are sold to institutional investors and usually also retail (individual) investors. An IPO is underwritten by one or more investment banks, who also arrange for the shares to be listed on one or more stock exchanges. Through this process, colloquially known as floating, or going public, a privately held company is transformed into a public company.

The main objective of the thesis is to assess the impact of selected variables on the stock performance of newly issued stocks on Shanghai Stock Exchange after three years of IPO. The analysis is based on 100 IPOs from the period 2009-2016.

This thesis is divided into five chapters. The first chapter is an introduction to the hole thesis. The second chapter is the introduction of Chinese stock market, and the IPO pricing system. The third chapter is an introduction to the methods used in this article. It introduces multiple regression model and economic verification. The fourth chapter is the evaluation and test of IPO performance of Shanghai Stock Exchange, and build a regression model. The last chapter is the conclusion of the thesis.

According to the performance evaluation of selected Shanghai Stock Market IPOs, we get a financial model of IPO pricing after three years, which is: $ln(Three\ years\ later\ price) = 0.22 \cdot ln(Net\ profit) + 19.79 \cdot Interest + 1.35 \cdot ln(GDP) - 7.24 \cdot Inflation - 19.54$, and this model is significant, homoskedasticity, no multicollinearity, and residual are not normal distributed. The interest rate, logarithm of net profit and GDP have positive relationship with logarithm of stock price in three years later of IPO. While inflation have negative relationship with dependent variable.

The Shanghai Stock Market should establish a reasonable, strict and efficient information disclosure and audit system to speed up the marketization process of the IPO system, enhance the sense of responsibility of intermediaries in the TPO process of GEM, and increase the corresponding punishment. It also should strict supervision

of intermediaries and improve litigation. The timeliness and rationality of the mechanism and compensation mechanism improve the professional standard and ethical standards of intermediaries to ensure their rationality and fairness in financial statements and profit forecasts.

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List of Abbreviations

IPO	Initial Public Offering
SPSS	Statistical Product and Service Solutions
ROE	Return on Equity
N	Number of Funds
DF	Degrees of Freedom
GDP	Gross Domestic Product
EPS	Earning Per Share
VIF	Variance Inflation Factor
CAR	Cumulative Abnormal Return Rate
BHAR	Buy-and-Hold Abnormal Returns
JB	Jarque-Bera Test
SSEC	Shanghai Index
NP	Net Profit
C	Capital
R	Interest Rate
I	Inflation

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Ostrava dated 23. 04. 2020

Xiaoyu Long 龙晓宇

Students' name and surname

List of Annexes

Annexe 1: IPO Characteristics

IPO code	Date	Issue price(yuan)	Open price(yuan)	Close price(yuan)	Number of share(10 thousand)）
601107	2009/7/15	3.6	7.6	10.9	50,000
601668	2009/7/22	4.18	6.7	6.53	1,200,000
601788	2009/8/4	21.08	30	27.4	52,000
601618	2009/9/9	5.42	7.33	6.94	350,000
601888	2009/9/23	11.78	16.11	17.08	22,000
600999	2009/11/10	31	35.01	33.61	35,854.61
601989	2009/12/7	7.38	8.41	8.3	199,500
601139	2009/12/11	6.95	13.22	15.17	13,000
601299	2009/12/21	5.56	5.8	5.69	250,000
601117	2009/12/25	5.43	5.76	5.75	123,300
601801	2010/1/5	11.8	20	17.63	11,000
601877	2010/1/11	23.98	26.51	28.83	10,500
601179	2010/1/19	7.9	8.02	7.79	130,700
601268	2010/1/22	8.5	8.5	8.15	30,000
601678	2010/2/8	19	19.2	22.14	11,000
601688	2010/2/9	20	21.01	21.06	78,456.13
601158	2010/3/16	6.98	10.99	12.1	50,000
601101	2010/3/23	29.8	41	38.96	11,000
601369	2010/4/15	15.5	18.12	19.27	10,925.13
601288	2010/7/6	2.68	2.74	2.7	2,223,529.4
601717	2010/7/20	20	28.8	31.44	14,000
601718	2010/8/4	3.5	5.8	6.17	115,700
601818	2010/8/10	3.1	3.37	3.66	610,000
601177	2010/9/27	8.29	15.88	18.06	10,100
601377	2010/9/27	10	14.66	14.86	26,300
601098	2010/10/20	10.66	14.03	13.8	39,800
600998	2010/10/25	13	18.25	18.98	15,000
601777	2010/11/15	14.5	19.9	17.87	20,000
601880	2010/11/23	3.8	4.59	5.24	76,182
601933	2010/12/7	23.98	32.03	32.29	11,000
601890	2010/12/15	22.5	26	23.98	9,000
601126	2010/12/24	23	28.22	31.11	8,200
601118	2010/12/28	5.99	9.53	11.01	78,600
601519	2011/1/20	23.2	24.91	25.38	11,000
601616	2011/1/25	19	19	17.9	10,500
601216	2011/2/10	25	26.01	26	12,000
601116	2011/2/21	11.8	19.11	21.78	6,000

601011	2011/2/24	18	27.11	25.75	9,700
601199	2011/3/9	18.8	21.51	20.55	5,880
601233	2011/5/5	27	27.18	29.71	12,000
601208	2011/5/12	20	21.22	22.78	8,000
601599	2011/5/18	10	14.22	16.79	5,300
601901	2011/8/1	3.9	5.51	5.6	150,000
601929	2012/2/10	7	10.88	13.12	28,000
601800	2012/2/15	5.4	6.99	6.66	134,973.54
603333	2012/4/25	9.3	11.47	11.67	8,667
603128	2012/5/17	6.66	7.83	8.05	10,000
601608	2012/6/27	4.67	4.69	4.79	68,500
603003	2012/8/8	6.5	12.5	10.7	5,050
603167	2012/8/23	11	11.27	11.76	10,100
603993	2012/9/24	3	8.7	9.63	20,000
603699	2014/1/9	17.66	21.19	25.34	8,250
603308	2014/1/13	8.28	9.94	11.1	8,001
603555	2014/1/15	10.6	12.72	15.26	8,900
601225	2014/1/17	4	4.8	4.55	100,000
603005	2014/1/23	19.16	22.99	27.59	5,667.42
603288	2014/1/24	51.25	61.5	66.41	7,485
603006	2014/6/18	9.93	11.92	14.3	2,000
603328	2014/6/19	15.31	18.37	22.05	9,000
603168	2014/6/20	21.85	26.22	31.46	1,635
603369	2014/6/23	16.93	20.32	24.38	5,180
603009	2014/7/10	7.01	8.41	10.09	2,667
603126	2014/7/23	3.46	4.15	4.98	8,000
603111	2014/7/23	6.89	8.27	9.92	7,230
603100	2014/7/23	6.72	8.06	9.68	10,000
603609	2014/7/30	5.88	7.06	8.47	8,000
603099	2014/8/13	4.54	5.45	6.54	6,667
603806	2014/8/28	27.18	32.62	39.14	6,000
603188	2014/8/28	20.49	24.59	29.51	7,200
601016	2014/9/18	2.17	2.6	3.12	17,778
600917	2014/9/22	3.25	4.68	4.68	15,600
603169	2014/9/24	1.68	2.02	2.42	10,000
603456	2014/9/24	15.43	18.52	22.22	5,196
603606	2014/9/25	8.2	9.84	11.81	3,535
603688	2014/10/24	6.45	7.74	9.29	5,595
603988	2014/10/24	14.88	21.43	21.43	2,000
603019	2014/10/24	5.29	7.62	7.62	7,500
603011	2014/10/27	4.26	6.13	6.13	4,500
601969	2014/11/25	10.34	12.41	14.89	18,667

603588	2014/12/19	18.23	21.88	26.25	4,040
601021	2015/1/12	18.16	21.79	26.15	10,000
603600	2015/1/15	10.22	14.72	14.72	2,500
603899	2015/1/15	13.15	18.94	18.94	6,000
603558	2015/1/15	19.25	27.72	27.72	2,000
603718	2015/5/6	6.81	9.81	9.81	7,000
601985	2015/6/2	3.39	4.07	4.88	389,100
603696	2015/12/1	10.1	14.54	14.54	3,000
603999	2015/12/1	9.77	14.07	14.07	6,000
601900	2016/1/28	6.13	7.36	8.83	16,910
603868	2016/4/5	18.03	25.96	25.96	4,360
603339	2016/5/6	10.19	14.67	14.67	5,170
601611	2016/5/25	3.47	4.16	5	52,500
603322	2016/7/18	11.99	14.39	17.27	2,000
600977	2016/7/28	8.92	10.7	12.84	46,700
601997	2016/8/4	8.49	10.19	12.23	50,000
601595	2016/8/5	10.19	12.23	14.67	9,350
603189	2016/9/2	7.26	10.45	10.45	5,520
603667	2016/10/12	8.8	12.67	12.67	5,060
603060	2016/10/28	10.04	12.05	14.46	5,500
603556	2016/10/31	23.63	28.36	34.03	9,334

Annexe 2: Price of Sample Stocks

IPO code	One years later price(yuan)	Three years later price(yuan)
601107	6.61	3.29
601668	3.75	3.21
601788	16.82	12.67
601618	4.01	2.1
601888	24.96	27.51
600999	24.16	9.18
601989	10.81	4.19
601139	12.8	9.18
601299	7.32	4.56
601117	5.65	7.86
601801	15.21	10.51
601877	23.92	17.81
601179	7.43	3.73
601268	13.24	5.04
601678	19.69	11.04
601688	13.57	11.78
601158	9.35	6.61
601101	48.08	12.37
601369	20.96	20.96
601288	2.7	2.48
601717	35.71	6.27
601718	4.59	2.47
601818	3.08	2.7
601177	12.51	7.61
601377	14.78	9.9
601098	9.69	12.37
600998	10.89	13.81
601777	9.97	6.54
601880	2.97	2.73
601933	29.79	13.91
601890	12.07	6.95
601126	16.82	18.36
601118	5.63	9.09
601519	10.65	6.04
601616	9.92	3.72
601216	16.67	15.45
601116	10.91	8.56
601011	14.64	8.56
601199	14.23	15.6

601233	11.1	5.84
601208	9.2	7.09
601599	7.7	8.34
601901	4.53	6
601929	7.36	11.87
601800	5.47	11.92
603333	5.26	9.45
603128	5.71	25.9
601608	3.28	17.71
603003	8.04	21.62
603167	7.28	10.89
603993	7.4	11.49
603699	19.75	17.38
603308	19.94	20.28
603555	20.21	30.76
601225	6.92	5.12
603005	47.19	27.57
603288	46.49	31.16
603006	49.67	25.53
603328	31.29	14.83
603168	59.63	24.2
603369	40.47	12.57
603009	22.13	43.12
603126	10.29	14.65
603111	15.72	19.68
603100	12.92	14.16
603609	15.36	11.42
603099	9.13	6.52
603806	37.64	29.96
603188	36.98	32.47
601016	6.18	10.5
600917	7.16	9.13
603169	8.12	6.35
603456	13.34	15.21
603606	16.74	19.73
603688	13.16	17.52
603988	23.15	20.13
603019	5.26	9.14
603011	3.85	7.26
601969	14.74	17.41
603588	30.16	35
601021	30.17	27.4

603600	16.35	18.21
603899	20	25.3
603558	30.15	26.5
603718	13.41	15.63
601985	8.26	9.13
603696	15.72	14.29
603999	20.36	17.73
601900	17.21	15
603868	13.82	9.35
603339	7.81	9.53
601611	21.31	24.52
603322	10.52	8.27
600977	6.52	8.64
601997	18.37	15.43
601595	7.29	5.36
603189	13.37	11.35
603667	17.35	19.61
603060	10.34	12.82
603556	30.54	34.12

Annexe 3: Data of Sample Variance (ROE, NP, EPS, C)

IPO code	ROE	Net profit	EPS	Capital
601107	7.50%	108,267.02	0.37	305,806
601668	11.79%	2,998,012.1	0.71	4,198,126.6
601788	12.36%	2,661,315.2	0.56	3,535,678.2
601618	14.20%	156,364.32	0.37	366,364.32
601888	15.62%	4,528,698.3	0.98	978,698.3
600999	10.33%	6,548,952.1	0.65	8,748,952.2
601989	6.54%	4,789,521.1	0.82	6,829,521.4
601139	12.53%	4,862,153.6	0.39	7,352,153.6
601299	15.55%	9,526,413.6	0.87	9,726,413.8
601117	13.36%	4,896,325.9	0.58	78,596,325.6
601801	9.38%	4,865,218.3	0.98	7,945,218.5
601877	5.36%	5,245,692.3	0.65	6,235,692.9
601179	12.36%	3,544,692.1	0.87	5,454,692.6
601268	15.36%	2,452,314.6	0.38	4,322,314.7
601678	18.36%	3,651,247.6	0.91	6,421,247.1
601688	15.94%	2,698,234.7	0.97	2,698,234.7
601158	10.35%	2,543,254.6	0.64	2,543,254.6
601101	11.32%	2,369,875.3	0.63	2,369,875.3
601369	5.36%	3,562,341.4	0.52	3,562,341.4
601288	9.31%	3,456,215.3	0.59	3,456,215.3
601717	14.25%	2,987,236.3	0.54	2,987,236.3
601718	22.30%	2,875,623.2	0.36	2,875,623.2
601818	20.33%	3,658,913.2	0.35	3,658,913.2
601177	15.55%	6,555,323.3	0.49	6,555,323.3
601377	16.32%	4,522,331.2	0.49	4,522,331.2
601098	17.98%	5,231,425.3	0.26	5,231,425.3

600998	15.98%	4,785,874.1	0.41	4,785,874.1
601777	16.98%	3,544,692.1	0.56	3,544,692.1
601880	10.32%	2,455,314.6	0.54	2,455,314.6
601933	11.58%	3,651,247.6	0.34	3,651,247.6
601890	9.32%	3,698,234.7	0.36	3,698,234.7
601126	8.32%	2,543,254.6	0.59	2,543,254.6
601118	12.35%	2,469,875.3	0.24	2,469,875.3
601519	11.39%	3,562,341.4	0.28	3,562,341.4
601616	5.31%	3,241,215.3	0.58	3,241,215.3
601216	7.35%	3,747,236.3	0.45	3,747,236.3
601116	14.36%	3,545,623.2	0.6	3,545,623.2
601011	24.36%	3,658,913.2	0.25	3,658,913.2
601199	8.32%	1,425,323.3	0.46	7,121,425.6
601233	15.39%	4,522,331.2	0.48	4,225,874.1
601208	17.95%	3,521,425.3	0.49	7,255,254.1
601599	14.32%	2,455,874.1	0.52	6,325,623.1
601901	15.95%	3,562,341.4	0.14	7,324,913.6
601929	14.85%	3,266,215.3	0.25	5,253,323.6
601800	19.32%	2,987,236.3	0.95	8,712,331.9
603333	18.65%	2,615,623.2	0.35	7,121,425.6
603128	17.32%	3,658,913.2	0.62	5,253,323.6
601608	19.35%	3,455,323.3	0.36	8,712,331.9
603003	16.32%	5,134,331.2	0.95	7,121,425.6
603167	14.62%	5,231,425.3	0.85	4,225,874.1
603993	9.32%	1,685,874.1	0.75	7,255,254.1
603699	8.63%	4,944,692.1	0.1	6,325,623.1
603308	11.25%	4,786,414.6	0.42	7,324,913.6
603555	10.32%	2,651,247.6	0.43	5,253,323.6

601225	14.65%	4,511,234.7	0.52	5,253,323.6
603005	15.32%	4,133,254.6	0.58	8,712,331.9
603288	17.32%	3,545,623.2	0.39	7,121,425.6
603006	15.32%	3,658,913.2	0.59	4,225,874.1
603328	15.47%	2,415,323.3	0.46	7,255,254.1
603168	14.32%	4,522,331.2	0.58	4,225,874.1
603369	16.98%	3,221,425.3	0.47	7,255,254.1
603009	20.36%	1,995,874.1	0.62	6,325,623.1
603126	21.98%	6,862,341.4	0.36	7,324,913.6
603111	18.95%	3,266,215.3	0.95	5,253,323.6
603100	16.34%	3,647,236.3	0.85	8,712,331.9
603609	15.25%	2,546,823.2	0.75	7,121,425.6
603099	11.32%	2,414,913.2	0.1	5,253,323.6
603806	9.45%	3,455,323.3	0.42	8,712,331.9
603188	8.65%	5,134,331.2	0.43	7,121,425.6
601016	10.33%	5,231,425.3	0.52	4,225,874.1
600917	15.65%	6,785,874.1	0.58	7,255,254.1
603169	18.95%	1,425,323.3	0.39	6,325,623.1
603456	19.32%	4,522,331.2	0.36	7,324,913.6
603606	17.15%	3,521,425.3	0.95	5,253,323.6
603688	10.03%	2,455,874.1	0.85	5,253,323.6
603988	14.09%	3,562,341.4	0.75	8,712,331.9
603019	15.32%	3,266,215.3	0.1	7,121,425.6
603011	14.85%	2,987,236.3	0.42	4,225,874.1
601969	18.09%	2,615,623.2	0.43	7,255,254.1
603588	19.22%	3,658,913.2	0.52	6,325,623.1
601021	10.87%	3,455,323.3	0.58	7,324,913.6
603600	14.96%	5,134,331.2	0.39	5,253,323.6

603899	14.36%	5,231,425.3	0.59	8,712,331.9
603558	19.32%	1,685,874.1	0.46	7,121,425.6
603718	18.78%	4,944,692.1	0.58	5,253,323.6
601985	15.45%	4,786,414.6	0.47	8,712,331.9
603696	20.98%	2,651,247.6	0.62	7,121,425.6
603999	21.48%	4,511,234.7	0.36	4,225,874.1
601900	15.95%	4,133,254.6	0.95	7,255,254.1
603868	14.96%	3,445,623.2	0.85	6,325,623.1
603339	16.75%	3,658,913.2	0.75	7,324,913.6
601611	10.98%	2,415,323.3	0.52	5,253,323.6
603322	11.25%	4,522,331.2	0.36	8,712,331.9
600977	12.48%	3,221,425.3	0.54	7,121,425.6
601997	16.98%	1,995,874.1	0.24	4,225,874.1
601595	14.88%	6,862,341.4	0.95	9,392,341.4
603189	13.25%	3,266,215.3	0.24	6,766,215.3
603667	10.36%	3,658,913.2	0.54	7,428,913.2
603060	14.65%	3,455,323.3	0.36	7,645,323.1
603556	19.32%	5,134,331.2	0.54	7,854,331.9

Annexe 4: Data of Sample Variance (R, GDP, I, SSEC)

IPO code	Interest	GDP	Inflation	SSEC
601107	5.31%	348,517.7	-0.70%	3,183.74
601668	5.31%	348,517.7	-0.70%	3,266.92
601788	5.31%	348,517.7	-0.70%	3,471.44
601618	5.31%	348,517.7	-0.70%	2,946.26
601888	5.31%	348,517.7	-0.70%	2,853.55
600999	5.31%	348,517.7	-0.70%	3,175.58
601989	5.31%	348,517.7	-0.70%	3,331.89
601139	5.31%	348,517.7	-0.70%	3,247.31
601299	5.31%	348,517.7	-0.70%	3,122.97
601117	5.31%	348,517.7	-0.70%	3,141.35
601801	5.31%	412,119.3	3.30%	2,688.52
601877	5.31%	412,119.3	3.30%	2,688.32
601179	5.31%	412,119.3	3.30%	2,611.12
601268	5.31%	412,119.3	3.30%	2,655.29
601678	5.31%	412,119.3	3.30%	2,610.74
601688	5.31%	412,119.3	3.30%	2,610.48
601158	5.31%	412,119.3	3.30%	2,639.37
601101	5.31%	412,119.3	3.30%	2,687.96
601369	5.31%	412,119.3	3.30%	2,613.15
601288	5.31%	412,119.3	3.30%	2,714.96
601717	5.31%	412,119.3	3.30%	2,588.64
601718	5.31%	412,119.3	3.30%	2,590.61
601818	5.31%	412,119.3	3.30%	2,729.12
601177	5.31%	412,119.3	3.30%	2,566.85
601377	5.31%	412,119.3	3.30%	2,613.12
601098	5.56%	412,119.3	3.30%	2,686.33
600998	5.56%	412,119.3	3.30%	2,702.22
601777	5.56%	412,119.3	3.30%	2,733.45
601880	5.56%	412,119.3	3.30%	2,696.89
601933	5.56%	412,119.3	3.30%	2,713.55
601890	5.56%	412,119.3	3.30%	2,750.42
601126	5.56%	412,119.3	3.30%	2,813.01
601118	5.81%	412,119.3	3.30%	2,733.25
601519	5.81%	487,940.2	5.40%	2,786.83
601616	5.81%	487,940.2	5.40%	2,813.15
601216	6.06%	487,940.2	5.40%	2,833.62
601116	6.06%	487,940.2	5.40%	2,845.23
601011	6.06%	487,940.2	5.40%	2,896.12
601199	6.06%	487,940.2	5.40%	2,903.05

601233	6.31%	487,940.2	5.40%	2,806.03
601208	6.31%	487,940.2	5.40%	2,886.35
601599	6.31%	487,940.2	5.40%	2,903.02
601901	6.56%	487,940.2	5.40%	2,912.35
601929	6.56%	538,580	2.60%	2,933.45
601800	6.56%	538,580	2.60%	2,952.12
603333	6.56%	538,580	2.60%	2,934.54
603128	6.56%	538,580	2.60%	2,913.45
601608	6.31%	538,580	2.60%	2,963.16
603003	6%	538,580	2.60%	2,654.88
603167	6%	538,580	2.60%	2,703.02
603993	6%	538,580	2.60%	2,829.54
603699	6%	643,563.1	1.50%	2,315.73
603308	6%	643,563.1	1.50%	2,328.72
603555	6%	643,563.1	1.50%	2,318.52
601225	6%	643,563.1	1.50%	2,290.03
603005	6%	643,563.1	1.50%	2,198.95
603288	6%	643,563.1	1.50%	2,210.48
603006	6%	643,563.1	1.50%	2,207.03
603328	6%	643,563.1	1.50%	2,209.47
603168	6%	643,563.1	1.50%	2,225.29
603369	6%	643,563.1	1.50%	2,241.1
603009	6%	643,563.1	1.50%	2,229.25
603126	6%	643,563.1	1.50%	2,210.48
603111	6%	643,563.1	1.50%	2,194.86
603100	6%	643,563.1	1.50%	2,219.47
603609	6%	643,563.1	1.50%	2,332.78
603099	6%	643,563.1	1.50%	2,319.47
603806	6%	643,563.1	1.50%	2,368.12
603188	6%	643,563.1	1.50%	2,332.15
601016	6%	643,563.1	1.50%	2,219.89
600917	6%	643,563.1	1.50%	2,302.36
603169	6%	643,563.1	1.50%	2,388.45
603456	6%	643,563.1	1.50%	2,396.12
603606	6%	643,563.1	1.50%	2,384.15
603688	6%	643,563.1	1.50%	2,312.98
603988	6%	643,563.1	1.50%	2,380.75
603019	6%	643,563.1	1.50%	2,383.76
603011	6%	643,563.1	1.50%	2,361.32
601969	5.60%	643,563.1	1.50%	2,353.71
603588	5.60%	643,563.1	1.50%	2,343.57
601021	5.60%	688,858.2	1.40%	3,148.14

603600	5.60%	688,858.2	1.40%	3,120.09
603899	5.60%	688,858.2	1.40%	3,273.75
603558	5.60%	688,858.2	1.40%	3,156.09
603718	5.10%	688,858.2	1.40%	3,343.6
601985	5.10%	688,858.2	1.40%	3,389.72
603696	4.35%	688,858.2	1.40%	3,631.32
603999	4.35%	688,858.2	1.40%	3,645.99
601900	4.35%	746,395.1	3%	2,711.16
603868	4.35%	746,395.1	3%	2,833.25
603339	4.35%	746,395.1	3%	2,666.32
601611	4.35%	746,395.1	3%	2,731.01
603322	4.35%	746,395.1	3%	2,832.12
600977	4.35%	746,395.1	3%	2,702.33
601997	4.35%	746,395.1	3%	2,734.56
601595	4.35%	746,395.1	3%	2,832.13
603189	4.35%	746,395.1	3%	2,931.02
603667	4.35%	746,395.1	3%	2,886.54
603060	4.35%	746,395.1	3%	2,813.62
603556	4.35%	746,395.1	3%	3,296.26

Annexe 5: Descriptive Statistics of Data Sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Issueprice~n	100	12.0638	8.213681	1.68	51.25
Openpricey~n	100	15.255	9.764518	2.02	61.5
Closeprice~n	100	16.3763	10.34926	2.42	66.41
Numberofsh~d	100	73566.15	260875.6	1635	2223529
Oneyearsla~e	100	15.9135	11.62815	2.7	59.63
Threeyears~e	100	13.8179	8.570907	2.1	43.12
ROE	100	14.318	4.077407	5.31	24.36
Netprofit	100	3716385	1410563	108267	9526414
EPS	100	.5408	.218057	.1	.98
Capital	100	6453777	7583387	305806	7.86e+07
Interestrate	100	.055608	.0060917	.0435	.0656
GDP	100	552829	133065.5	348517.7	746395.1
Stockmarke~C	100	2719.063	350.0878	2194.86	3645.99